ENGINEERING
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# PIT AND QUARRY

NOVEMBER 1947

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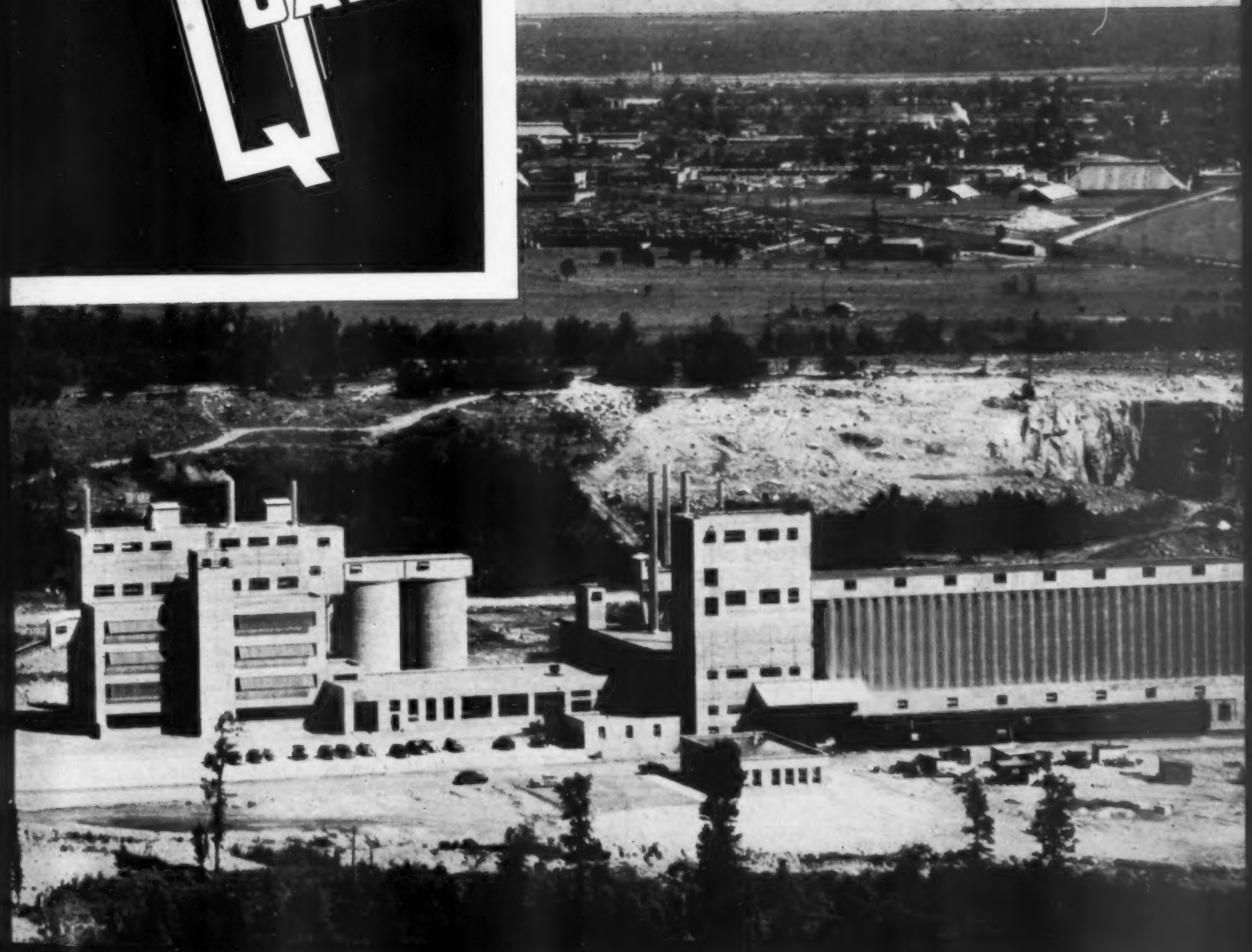
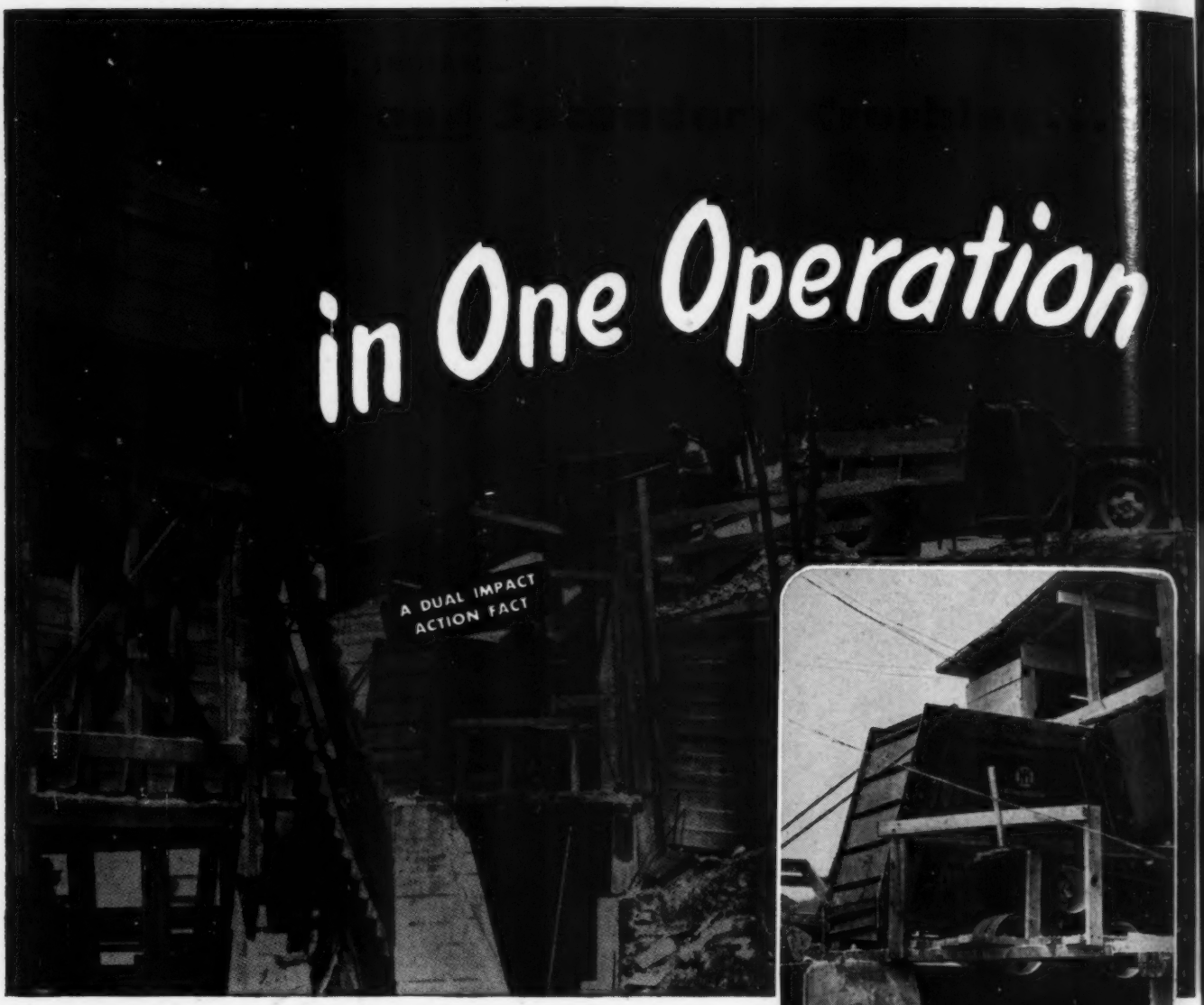


# in One Operation




## ...with the New Holland Model 3030 Breaker

The Napoleon Lime Industry of Indiana is reducing extra-hard, run of the quarry rock from minus 30" to 50% ¾ down stone and 50% lime dust *in one operation* . . . at the rate of 75 tons an hour with their New Holland Model 3030 Breaker. In producing the first 50,000 tons the impeller bars, which have four striking surfaces, were turned just once. This promises a life expectancy of 150,000 to 200,000 tons . . . exceptional for this material.

Robert McClanahan, partner in the Industry, says, "The machine seems to be holding up in good shape and so far we are very much satisfied with it."

Primary and secondary crushing with a New Holland Model 3030 Breaker reduces equipment investment . . . cuts handling costs . . . gives more tons for each production dollar. Bigger profits are the result. Write today for the illustrated catalog explaining Dual Impact Action Breakers in detail.

*Ask your distributor to show you "The New Stone Age," a color film of the 3030 Breaker in action.*

**NEW HOLLAND MANUFACTURING COMPANY**

**Mountville, Pennsylvania**

DOUBLE IMPELLER *Breakers*

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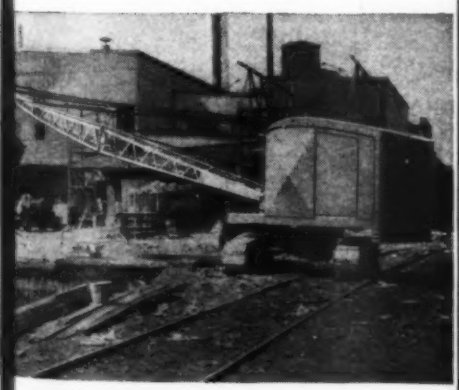
swing

In close quarters, trucks often can't be spotted for short swing. High swing speed of Koehring 304 cuts swing time approximately 20%, gets extra yardage every shift.

Highway work where shovel swing radius often is longer than 90 degrees, calls for high swing speed. On jobs like this, Koehring 304 can step up production 5 to 10%.



Shifting back to standard swing speed, when you're working Koehring 304 as clamshell or crane, takes only 2 seconds. You can select best swing speed for each front end attachment for any type of work.

MILWAUKEE 10, WISCONSIN

*Johnson*

# EXTRA TONNAGE at NO EXTRA COST

## FASTER OPERATION

Large diameter sheaves, with fully sealed needle bearings, reduce friction power loss, deliver full power to cutting lips to provide faster, smoother operation.

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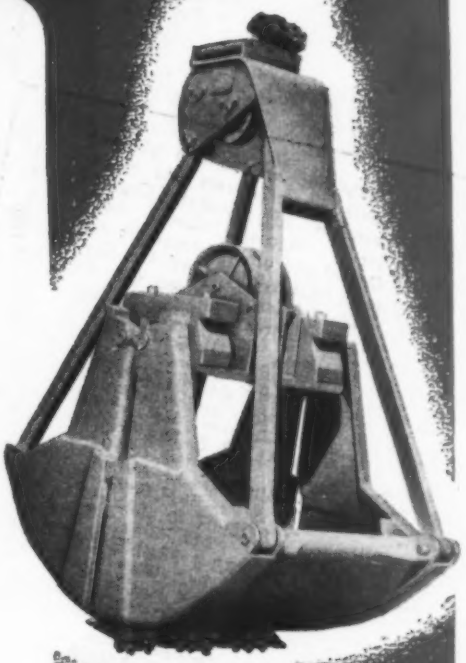
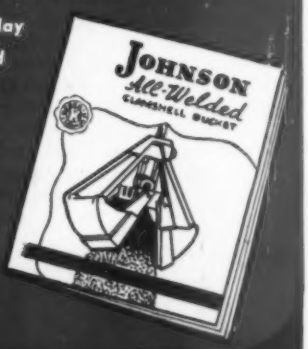


⅜ to 2½ yard sizes. General Purpose, Wide Rehandling and Heavy-duty Digging Type.

*Write today illustrated catalog.*




THE C. S. JOHNSON COMPANY

KOEHRING SUBSIDIARY CHAMPAIGN, ILLINOIS

PIT AND QUARRY

NOVEMBER 1947

Vol. 40 No. 5

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**PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX**

To subscribers: Date on lower right-hand corner of envelope indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

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# EDITORIAL

## *Post-War Plants*

AS our readers may have gathered, from looking through this and other recent issues of PIT AND QUARRY, the nonmetallic minerals industries are adding many new and outstanding plants to their ranks. Many post-war plants have already been described in these pages, but most of these have been the smaller and less complicated plants which could be built most quickly even in a period of equipment and labor shortages, or they have been plants built at least partly with used or surplus equipment. The small and medium-sized plants, of course, form the backbone of most of these industries, but it is with unalloyed pleasure that members of our editorial department again welcome the opportunity to inspect and describe operations which are the last word in plant design and operation and which are photogenic inside and out.

In the September and October issues complete descriptions were published, among others, of modern, completely new plants producing gypsum board and lath, bituminized aggregates, lime, crushed stone, sand and gravel, ready-mixed concrete, etc. All these plants incorporated the latest in equipment and operating methods, and are among the most advanced examples of technical progress in their respective industries.

In this issue we are proud to present several more articles on plants which are outstanding in their fields. Particularly outstanding is the new roofing granules plant of the Minnesota Mining & Mfg. Co. at Little Rock, Ark. This plant is said to be the largest and most efficient of its kind, and two members of our editorial staff who have inspected it concur enthusiastically in this appraisal.

The new concrete block plant of the Illinois Brick Co., Blue Island, Ill., which is completely described in The Concrete Manufacturer section of this issue, is generally conceded to be the largest and most advanced plant of its kind. It is also notable because it is probably also the most highly-mechanized plant in that field, and marks the closest approach yet made to the ideal, completely-automatic operation which alone can insure the production of uniformly high grade products.

The limestone mine of the Columbia Chemical Division of the Pittsburgh Plate Glass Co., at Barberton, Ohio, which is also described in this issue, is not new, but it is new to most of our readers as it has received no publicity since the early stages of its development. This is not only the deepest limestone mine in the world, but also one of the largest and best. In every way it compares favorably with the most modern metal or coal mines, and in many ways it improves on them. The latest methods and types of equipment are used and all possible provisions are made for the safety and comfort of the workers.

More and more of these new and modern post-war plants are now being completed at a rapid rate and we can promise our readers that in each future issue one or more such plants, in virtually all the many nonmetallic minerals industries, will be described.

## *Machinery Exhibits at Conventions*

THE general enthusiasm with which the producers of sand and gravel and crushed stone have received announcements that machinery exhibits are again to be a part of the 1948 annual conventions of their respective associations reaffirms the fact that such an exhibit forms an important part of a convention. Producers come to conventions mainly to learn about the latest developments of all kinds affecting their industries and their own businesses. In recent years the importance of the mechanical phases of these industries has become increasingly evident as improved design, and labor shortages and costs, have accentuated the trend toward mechanization, and automatic operation and control.

The other reasons for attending these conventions are important and will continue to be so. At these meetings producers learn from top-flight trade association executives, economists, business analysts, government bureau heads, political leaders, etc., what are the latest developments in the governmental, legal, economic, and other more or less abstract phases of their businesses. Top trade association technical and research directors, specialists from government bureaus, and other authorities advise them of the latest technical developments, testing and control methods, research, etc. In these meetings, and in mingling with each other, and with the machinery company representatives and others who attend these conventions, a producer also enjoys the opportunity of comparing his methods and ideas with producers and others from all sections of the country.

Without detracting in the least from the importance of the other advantages derived from attending these conventions, we believe that no such meeting is really complete unless it gives the producer an opportunity to actually examine and compare the various makes and types of equipment in which he is interested. In no other way is it possible for him to discuss their merits with the men who make and sell them and with other men who use them.

The members of the National Sand and Gravel Assn. and the National Crushed Stone Assn., their boards of directors and executives, and their manufacturers' divisions are to be commended for again making these exhibits possible. They were wise also to continue to cooperate by holding their meetings in consecutive weeks in the same hotel, thereby insuring the greatest possible number of exhibitors. We believe it was also a wise move to hold these exhibits every second year, as they are expensive and time consuming.

The meetings of these associations—which have done so much for their members and their industries in general—and the machinery exhibits, are open to all producers, whether members of these associations or not. Those attending will find that the benefits gained will be well worth the time and expense involved. A new record in attendance will probably be set and, because hotel accommodations are still hard to get, reservations should be made as soon as possible. The combined conventions of the National Sand and Gravel Assn. and the affiliated National Ready Mixed Concrete Assn. will be held January 19 through 23, 1948 at the Netherland Plaza Hotel, Cincinnati, Ohio. The combined conventions of the National Crushed Stone Assn. and the affiliated Agricultural Limestone Division will be held at the same hotel the following week, January 26 through January 30.

Walter E. Trauffer

ROCK PRODUCTS AND QUARRY

CHICAGO NOVEMBER, 1947

## Lowest Injury Severity In 12 Years Reported For N. L. A. Competition

Injury severity at the 36 competing plants in 1946 was the best annual experience in the 12-year history of the National Lime Association Safety Competition, according to the U.S. Bureau of Mines. Severity rates fell 38 percent from an average of 4.692 days lost per 1,000 man-hours of work in 1945 to 2.925 in 1946 and 31 percent from the 12-year average of 4.240. However, occurrence of injuries increased to 34.203 per million man-hours in 1946, as compared with a frequency of 30.226 in 1945 and a 12-year average frequency of 33.986. Men at these 36 lime producing plants worked a total of 6,987,664 man-hours, an average of 194,102 man-hours per plant, which is the highest average for any contest year.

The Asbury plant of The Standard Lime & Stone Company at Knoxville, Tenn., was awarded a certificate of honor for its splendid safety achievement of injury-free operation throughout 1946. This plant worked 134,674 man-hours during 1946 and was the only plant in the competition to complete the year without a lost-time accident. The record of this plant during its eight years of enrollment is outstanding, as it has been awarded certificates of honor for perfect safety records six times in past contests—in 1940, 1941, 1942, 1943, 1944, and 1946. The Asbury plant has participated continuously since 1939 and during these eight years it has been in operation a total of 903,967 man-hours with an injury frequency of 4.425 per million man-hours and an injury severity of 0.785 per thousand hours of exposure to hazards.

The reduction in enrollment in the 1946 contest from 42 plants in 1945 to 36 plants in 1946 is due in part to the requirement in the rules of the 1946 contest that lime plants have an associated quarry. However, the rules of the 1947 contest have been changed and classifications have been established for purposes of award which will permit participation of all lime-producing operations. The new classifications in the competition will segregate competing plants with approximately equal hazards into groups and will eliminate the inequalities of competition under former rules. The new groupings will be: (a1) lime operations with both quarry and calcining plant working 100,000 or more man-hours during the year, (a2) lime operations with both quarry and calcining plant working less than 100,000 man-hours during the year; (b) lime operations with both underground mine and calcining plant; and (c) lime calcining plants without associated quarry or mine.

## Colonial Sand & Stone Company Acquires Trucking Business

Generoso Pope, president of Colonial Sand & Stone Co., Inc., of New York City, has announced the purchase of all the capital stock of James A. Norton, Inc., operators of a fleet of trucks in the metropolitan area.

The Norton facilities will be operated separately under the former officers, with J. A. Norton continuing as president.

## Coming Events

*December 1-6, 1947—New York.* 21st Exposition of Chemical Industries, Grand Central Palace.

*January 20-23, 1948—Cincinnati.* 32nd annual convention and exhibit, National Sand and Gravel Association, Netherland Plaza Hotel.

*January 26-28, 1948—Cincinnati.* 31st annual convention and exhibit, National Crushed Stone Association, Netherland Plaza Hotel.

*January 29-30, 1948—Cincinnati.* 3rd annual convention and exhibit, Agricultural Limestone Division, National Crushed Stone Association, Netherland Plaza Hotel.

*February 15-19, 1948—New York.* Annual meeting, American Institute of Mining and Metallurgical Engineers, Pennsylvania Hotel.

*April 4-6 1948—Hot Springs.* Annual convention, National Lime Association, The Homestead.

## FHA's August Report On Home Construction Shows Record Figure

Construction was started during August on 25,166 new dwelling units financed and built under the program of the Federal Housing Administration. This is a greater number than in any post-war month, and the second largest in the history of FHA, Commissioner Franklin D. Richards has announced. The record volume was 26,100 units started in July, 1941.

The August total was more than four times the 5,777 units started in the same month last year under the FHA program, and nearly three times the 1946 peak of 8,696 started last October.

Practically all of the record total of new units started are being built and financed under the emergency provisions of the National Housing Act to help private industry provide homes for World War II veterans and their families (Title VI). A record number of 7,212 units are in rental housing projects where veterans will be given preference. The balance are in one- to four-family houses, most of them being built for rent or sale to veterans.

## Lehigh Plant at Sandts Eddy Joins P.C.A. 1000 Day Club

The Sandts Eddy plant of the Lehigh Portland Cement Co. became a member of the Thousand Day Club of the Portland Cement Association when it completed that number of days without a lost-time accident on September 5.

James A. Gish Jr., plant manager and also a vice-president of the Lehigh Valley Safety Council, praised the plant employees for their cooperation in making the record possible.

The plant is the second one of the Lehigh company to attain a 1,000-day record this year. The Union Bridge, Md., plant passed that number of days on April 8. Six other plants of the company have perfect safety records so far this year.

---

According to the *Mining Congress Journal*, an amendment to the state mining code was passed by the Oklahoma legislature in May, permitting diesel engines, provided with adequate safety equipment, to be operated in lead and zinc mines.

## Frank Moyle of Marquette Cement Manufacturing Co. Addresses Union Meeting

The amicable employer-employee relationship long prevailing in the ranks of Marquette Cement Manufacturing Company was again brought into sharp focus when, at the invitation of union officials, Frank Moyle, Marquette director of operations, appeared as guest speaker at the ninth annual district convention of the United Cement, Lime & Gypsum Workers International Union. The convention was held at the Marquette Hotel in Cape Girardeau, Mo.

Frank Moyle

Mr. Moyle stressed the need for mutual understanding and cooperation among all elements of the American business structure. "Intelligent teamwork guided America to the position it holds in the world today. Intelligent teamwork —*voluntary* cooperation between all men —can be the only sure way to hold this place," he said.

Speaking of sound and equitable wages, Mr. Moyle continued, "Intelligent Labor leaders know that wages must come out of production. Those who are interested only in wage increases and not increased production will 'kill the goose that lays the golden eggs.' Production is the key to success or failure of the worker and the company. Low production or no production hurts everyone."

## R. H. Bogue Writes Volume On Cement Chemistry

*The Chemistry of Portland Cement,* a comprehensive survey of the fundamental theoretical conceptions and practical applications of cement chemistry, is the work of Robert Herman Bogue, who has been for the last 23 years research director of the Portland Cement Association's fellowship at the National Bureau of Standards.

Included in the 380-page volume (Reinhold Publishing Corporation) are chapters on the history of cement, its chemical and physical structure, hydration, setting, physical properties and applications. Part I, "The Chemistry of Clinker Formation," covers the classification of cements, its manufacture, early experimentation, methods of classification and other more technical aspects. Part II, "The Phase Equilibria of Clinker Components," is a technical discussion of the principles and technics of high-temperature phase research; and Part III, "The Chemistry of Cement Utilization," deals with the phenomena involved in hydration, hardening and setting.

## Permanente Cement Company Acquires Pacific Coast Stock

The Pacific Coast Cement Company, a subsidiary of the Pacific Coast Cement Corporation, has sold its preferred and common stock interest in the parent concern to the Permanente Cement Company. The latter firm will make an offer to the minority stockholders of the Pacific Coast Cement Corporation to purchase their shares.

## State Highway Officials Urge Further Federal Aid At 33rd Annual Meeting

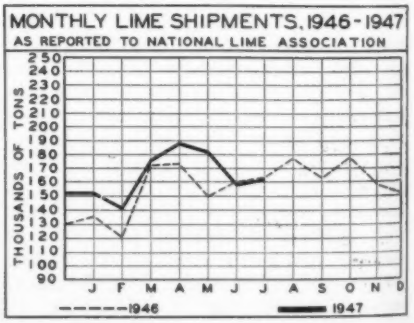
Congressional authorization of not less than $500,000,000 for each of the fiscal years of 1949, 1950 and 1951 for federal aid highway construction was urged in a resolution adopted by the American Association of State Highway Officials at the concluding session in New York of its 33rd annual meeting in September.

Pointing out that the Federal Highway Act of 1944, providing $500,000,000 for each of the years 1946, 1947 and 1948, has enabled states to plan intelligently a continuing program of highway improvement and has resulted in most efficient use of the funds, spokesmen of the association declared that similar funds for the future are needed for the continuation of the highway program.

Through other resolutions the association called for uniform state speed and weight laws, for a ban against construction of airports or landing fields within 65 feet of a public highway, for increased appropriation of federal funds for forest highways, for the establishment of the Transportation Corps as a regular unit of the Army, for long-range planning on road projects by all states, and for a retirement plan for state employees.

Robert H. Baldock, chief engineer of the Oregon State Highway Department, who was elected president of the association to succeed Tennessee State Highway Commissioner C. W. Phillips, warned that there are a million miles of highways in the United States in a state of dangerous deterioration.

Senator John S. Cooper of Kentucky, chairman of the subcommittee on roads of the Senate Commission on Public Works, urged that the next session of Congress extend the Federal Highway Act of 1944 for three years beyond its scheduled termination in 1950.




According to data collected by the National Lime Association, 45 companies in July, 1947, shipped 162,051 tons of lime (93,841 quicklime; 68,210 hydrate). Reporting companies represent 45.8 percent of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 390,000 tons. Shipments of lime by users for July, 1947, were:

| | Quicklime (tons) | Hydrate (tons) |
|---|---|---|
| Agricultural | 745 | 8,069 |
| Building | 11,643 | 34,941 |
| Chemical | 81,453 | 25,200 |
| Total | 93,841 | 68,210 |

• At Nisku, Alberta, Canada, the Pioneer duplex crushing plant (foreground) operated by the public works department of the province is powered by a "Caterpillar" diesel D13000 engine. In the background may be seen the asphalt plant, whose gravel dryer is powered by a D13000 industrial engine. For bringing the gravel to the hopper of the crusher, a diesel D7 tractor is used; it is equipped with a cable control and a No. 7A bulldozer.

## Cheney Lime & Cement Co. Gets 5-Ton Lime Kiln Bed Made in Four Sections

What is believed to be the largest and heaviest cast-iron product ever molded in northern Alabama—a five-ton lime kiln unit—was recently turned out for the Cheney Lime and Cement Company of Birmingham by the Owen Iron Works at Gadsden, Ala.

The bed plate weighs 8,000 pounds and its eight cast-iron doors make an additional 2,086 pounds—a total of 10,396 pounds. The main portion was made in four sections, each weighing a ton. To remove these big sections, a motor wrecker was backed into the foundry and a chain hoist was fastened to each in turn; they were literally pulled out of the plant. Assembled, the bed plate is 10 feet square and 2½ inches thick. It has a circular opening six feet in diameter. The whole assembly is valued at more than $3,000.

The men who cast the big plants were six World War II veterans.

## Olympic Portland's New Kiln To Produce 500 Tons a Day

Post-war modernization at the Bellingham, Wash., plant of the Olympic Portland Cement Company, Ltd., has been making rapid strides during the installation of a $500,000 rotary kiln. When completed, the big job will be 410 feet long, with a diameter of 11 feet. It will weigh more than 3,000,000 pounds.

Commenting upon the investment, H. M. Krabbe, supervising engineer, stated that the kiln, which replaces three outmoded earlier models, will boost production 10 percent. Production with "Big Caesar," he added, will begin early next year at the rate of 3,000 barrels of cement (500 tons) daily.

## A.G.C.A. Survey Finds Building Construction Costs Still High

By means of a telegraphic survey of 101 chapter managers and secretaries of the Associated General Contractors of America it was indicated recently that costs of building construction, residential and nonresidential, as well as highway construction, throughout the United States are still following a slight upward trend. It was further established that this trend follows cost increases in materials and labor. Low labor productivity also affects the national picture.

The results of the survey formed the basis of study and discussion at the fall meeting of the organization's governing and advisory boards at Des Moines, Ia.

## Scottish Quarry Industry Slowed by Steel Shortage

According to recent news from Scotland, the main bottleneck in the quarrying industry in that country is the scarcity of structural steel for machinery. The average time interval between ordering and receipt of equipment is 12 months, although in some instances "specialized" machines were secured within 8 months. One quarry engineering concern states that such equipment could, in normal times, be produced within six weeks.

Occasionally, it is reported, production is suspended for lack of some trivial component; a shortage of washers, ball bearings or parts of various types can bring the entire production line to a halt. The labor situation, although somewhat abnormal, is not regarded as a major factor in the production slow-down.

## Marquette's Annual Report Winner in National Contest

For the third consecutive year, Marquette Cement Manufacturing Company's annual report to its stockholders has been awarded first place among all cement industry reports, according to Weston Smith, vice-president of the magazine *Financial World* and director of the magazine's annual survey of stockholder reports. An "Oscar of Industry" signifying the company's first place position, was presented to W. A. Wecker, president of Marquette Cement Manufacturing Company, at an award banquet at the Hotel Pennsylvania in New York on October 10.

In winning this award, the entry of Marquette Cement Manufacturing Company competed against the annual financial reports of more than 3,500 companies in 80 different industries.

## O. E. Benson Appointed To Executive Post at General Crushed Stone Co.

Otho M. Graves, president of the General Crushed Stone Company of Easton, Pa., has announced a new promotion for Oscar E. Benson, who in June of this year joined General Crushed Stone as assistant to the president. Mr. Benson was made vice-president and general manager of the company on September 22.

Oscar E. Benson

Before coming to General Crushed Stone, Mr. Benson was associated with the Metropolitan Edison Company as vice-president and general manager of the Easton Division.

A $60,000 enterprise will soon be launched near Oakdale, Calif., when the Wallace Engineering Company of Escalon, Calif., begins operating a gravel plant at its newly-acquired site on one of the largest gravel deposits in the state. The new firm will be known as the Wallace Material Company.

Officials of the Calaveras Cement Company of San Francisco, Calif., recently arranged a safety meeting for the firm's transport and quarry truck drivers. Speakers included William R. House, an insurance safety engineer, and a traffic officer of the California Highway Patrol.

*Courtesy of Authenticated News*

• A winter scene at Beroun, Czechoslovakia, showing a worker using a drill to break up large pieces of limestone. The shovel is loading the limestone on railroad cars. This area has many limestone quarries and cement mills. Volunteer workers are asked to contribute work so that the industry may be kept going without further interruption.

## United States Mines Bureau Releases Statistics on Total 1946 Lime Shipments

According to data released by the U. S. Bureau of Mines, the following figures are official for 1946 lime shipments:

| | Short tons |
|---|---|
| Total agricultrual shipments | 384,658 |
| Total construction shipments | 845,604 |
| Total chemical shipments | 3,684,455 |
| Total dead burned dolomitic shipments | 1,077,983 |
| Grand total | 5,992,700 |

These figures represent an increase of approximately 1 percent over those of 1945, when the total shipments were 5,920,000 short tons.

The largest use increase in 1946 over 1945 was in the construction field, which amounted to 296,000 tons. Total agricultural lime shipments increased 2½ percent over those of 1945; and total chemical lime shipments decreased 3 percent, a fair record in spite of strikes and other unfavorable conditions. The greatest decrease in shipments was in the field of refractory dolomite— 109,000 tons or 10 percent.

## Kansas Mining Concern Uses Old Coal Cars for Bins

The Buckeye Furnace Mining Co., organized in 1946 by the owners of the Narrow Mfg. Co. (now owned by the McNally Pittsburg Mfg. Co., Pittsburg, Kan.), uses two condemned railroad coal cars for storage bins. They were purchased from the Baltimore and Ohio railroad, and at the time of delivery to this Ohio plant were lifted into place by a railroad wrecking crane.

Using the crane solved the problem of handling for the mine and also permitted the railroad to salvage the trucks belonging to the cars immediately. The new prepared-coal storage bins will permit the stoker and carbon cars to be loaded on the same track, leaving the run-around track open. The erection of the additional storage bins brings the total storage capacity for the mine, for both raw and prepared coal to 700 tons.

## Consolidated Rock Products To Expand Facilities at Azusa

Approximately 232 acres of sand and gravel land was recently purchased by the Consolidated Rock Products Company at Azusa, Calif., from the Azusa Foot-Hill Citrus Company. The property had been leased by Consolidated and its predecessor companies since 1914. It has been estimated that about 12,000,000 tons of material was excavated from the tract during the last 33 years.

According to an announcement released by Consolidated at the time of the purchase, the company plans to modernize its entire plant at an estimated cost of $250,000.

## Pacific Coast Aggregates Stages Show at State Fair

Pacific Coast Aggregates, Inc., of San Francisco, Calif., had an impressive exhibit at the California State Fair held early in September at Sacramento.

Many of the firm's products were on display, and there to answer questions were ten members of the P.C.A. sales staff. They included Philip Dalton, Pat Ryan, Bill Trunnell, Carl Caughrn, Ben Knabe, Ron Davies, Charles Porter, George Schmitt, Charles Lockwood and Mario Gianetti.

L. W. Hayes, president and general manager of L. W. Hayes, Inc., who operates quarries at Paola, Kan., and Bethany, Mo., has donated 400 tons of crushed stone to the residents of Worth, Mo., the town which was nearly demolished in a tornado on April 29, 1947. The material is being used for building new homes and commercial structures.

• A view of the coal-car bins at the Buckeye Furnace Mining Company's facilities—a practicable scheme worth imitating.

*Courtesy Coal Age*

## P.C.A. Training Course To be Under Guidance Of John A. Ruhling

Frank T. Sheets, president of the Portland Cement Association, has announced the establishment of a 13-week training course in the fundamentals of concrete making and concrete construction practices for technical personnel of the association and its member companies. John A. Ruhling, manager of the association's Housing and Cement Products Bureau since 1944, has been appointed manager of the course.

John A. Ruhling

"Not only will this intensive training in modern construction practices enable new men on our staff to serve the public more effectively," Mr. Sheets said, "but . . . to develop into positions of greater responsibility more rapidly.

"The association is one of the oldest and strongest in the construction field. For more than 30 years its field engineers have been rendering helpful service to users of concrete. The new training course is part of a greatly expanded research, development and educational program recently announced by the association. The objective is to continually improve the quality of construction using portland cement and to effect economies in time and use of materials."

John A. Ruhling, who will conduct the training course, starting October 1, has had nearly 30 years' experience in various fields of construction involving uses of portland cement concrete. He received his engineering training at Armour Institute of Technology and held important assignments with the Sanitary District of Chicago and the Bridge Division, Chicago Board of Public Works.

Carl A. Menzel, who has been a research engineer with the association since 1928, will assume Mr. Ruhling's former duties. Mr. Menzel has had more than 30 years of close association with scientific research in the construction industry.

## Pennsylvania Legislature Passes Law to Tax Materials Mined in State

Under a new law passed by the recent session of the Pennsylvania legislature, municipalities are taxing ten cents a ton on all coal mined in their precincts, 25 to 50 cents a ton on stone quarried and soil removed from the areas and one to 25 cents each on pit posts and mine timbers cut from the region within their domain.

## Marquette Dust Collectors Cut Cement Dust at Oglesby

The first of three large dust collectors has been installed at the Oglesby, Ill., plant of the Marquette Cement Manufacturing Company. The collector was put into service on August 7. The second was reported to be nearly ready to be put in operation; and the third was scheduled to be completed within a week.

Company employees worked 12-hour shifts for several weeks to complete the installation of the collectors.

## U. S. Mines Bureau Recovers Alumina from S. C. Kaolin

A large recovery of alumina from South Carolina kaolin, popularly known as porcelain clay, has been obtained in metallurgical tests conducted by the U. S. Bureau of Mines, Dr. R. R. Sayers, bureau director, announced in releasing a publication describing the use of the lime-soda sinter process.

Bureau investigations of high-alumina clay deposits in Aiken County, S. C., have proved the presence of 10,000,000 tons of kaolin with an alumina content of at least 33 percent. Approximately one-half of the deposit has an alumina content greater than 35 percent. An additional 9,000,000 tons of similar-grade deposits were indicated in the area, the report states, and total tonnage that may be inferred from geological evidence is several times the sum of these figures.

## Work Resumed at Sand Plant Wrecked by Old Man River

Operations of the Walker Sand and Gravel Company at Clay Center, Kan., interrupted early this summer by flood waters of the Mississippi River, recently were reported about to be resumed.

The plant was damaged by the rampaging waters to such an extent that a new pump, a 150-hp. motor and other equipment had to be purchased. Operators of the plant are Audley Walker and his son, Carmen.

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At the LaSalle, Ill., plant of the Lehigh Portland Cement Company 20 employees recently were "graduated" from a 20-hour first-aid class conducted by John M. Welch of Peru, Ill., for the American Red Cross. It was the first such industrial group to finish the course in 15 years in the LaSalle area.

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Total sales of mineral earth pigments were 14 percent greater than that reported in 1945, according to figures submitted by processors to the U. S. Bureau of Mines. The construction boom in 1946 placed severe demands on paint materials of all kinds, and the earth pigments shared the rising market with lead, zinc, and titanium pigments.

## Weaver Transforms Plant Into $100,000 Operation For Processing Limestone

Restoration of the old Carthage, Ill., city quarry has transformed the abandoned facilities into one of the largest limestone crushing plants in this section, with a valuation of $100,000. The work was undertaken by the M. O. Weaver Construction Company of Des Moines, Ia., which is now operating the plant.

When all the new equipment has been installed, reports W. W. Weaver, superintendent of the plant, production will be from 1,000 to 1,500 tons per day.

## National Gypsum Company Issues Semiannual Report

An attractively-illustrated folder recently issued by the National Gypsum Company contains a consolidated income statement for the six months ending June 30, 1947.

Net profit for this period is $2,531,446. A statement from President Melvin H. Baker indicated that "allowing for preferred dividends, this sum amounted to $1.39 per share of common stock, compared with 93 cents for the corresponding period last year.

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Cementos Hidalgo at Monterrey, Mexico, has purchased a new clinker grinding mill as the first step toward a rehabilitation program. Additional steam power equipment is also on the list.

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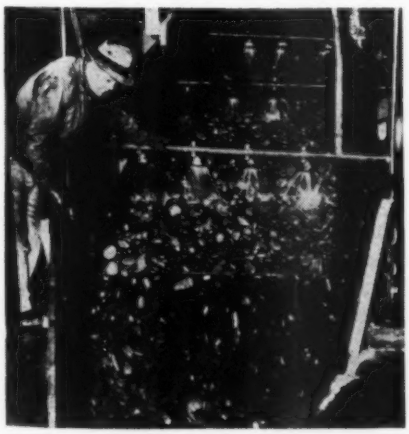
A golden anniversary was observed recently at Ormrod, Pa., by the Lehigh Portland Cement Company, which opened its first plant there 50 years ago.



• Lined with Goodrich "Armorite," special rubber compound designed to resist conditions of extreme abrasion, the chute pictured above has been in service at the Wyoming Sand and Stone Company, Falls, Pa., for more than seven years. Approximately 800,000 tons of sand and gravel have moved over it, with the lining showing little sign of wear. Previous to its installation, two sets of ½-inch steel plate were used annually on the chute, each requiring about 36 hours of installation time by several workmen. Arthur C. Caldwell, plant superintendent, is shown watching gravel leave the vibrator screen which is a part of the chute.

• A 105 c.f.m. Schramm compressor (left) at work in the Fond Du Lac Stone Company's quarry at Fond Du Lac, Wis. The firm produces various kinds of material, among them flagstone and agricultural limestone, which it ships to destinations in seven states.

## $2,000,000,000 Budget Needed for Highways In New York State

Two billion dollars must be spent during the next 14 years to make New York State's highways efficient and safe, according to an estimate made by State Public Works Superintendent Charles H. Sells in a comprehensive report submitted to Gov. Thomas E. Dewey.

Terming the present efficiency of the New York State highway system as "dangerously low," Sells declared that an average of $143,000,000 must be spent annually until 1960 if the roads are to be made as efficient as they were 17 years ago.

He explained that the present poor condition of the highways is "the inevitable result of 15 years of starvation appropriations during the depression and of work prevention during the war."

The public works chief, who prepared two years ago the state's present $840,000,000 postwar program for rehabilitation of highways, including a $200,000,000 New York-to-Buffalo Throughway, said it is a year and a half behind schedule because of high costs and shortages of equipment and material. That program, he emphasized, is now inadequate.

## Red Ring Record—Voice of Missouri Portland Cement Co.

*Red Ring Record* is the name of an attractive publication issued quarterly by the Missouri Portland Cement Company. The third number carried on its cover a photograph of the firm's Sugar Creek plant, located near Independence, Mo. An editorial note states that more than 10,000,000 tons of limestone and shale have been mined at this site. The first article in the magazine tells the story of this plant.

Other features include an editorial by President M. Moss Alexander, a department which features the "old timers" in the firm's employ, an article by Stephen G. Gould, general sales manager and safety notes. The name *Red Ring Record* is taken from the company's brand name and emblem for its standard grade portland cement. Elizabeth Bartley is the editor.

## 440 U.S. Gypsum Workers Get Raise by Contract Revision

Employees of the U. S. Gypsum Co. plant at Oakfield, N. Y., receive a general wage increase of ten cents an hour under a contract revision announced by District 50, United Mine Workers, AFL.

Thomas Dunn of Buffalo, District 50 representative, said the wage boost for 440 employees is effective until January 21, 1948, expiration date of the current contract.

Dunn declared the revision also gives an extra 2½ cents an hour to employees with less than a year's service because it eliminates a service differential. The new outside base pay rate is $1 an hour.

## Reardon Industries Appeals For Lower Insurance Rates

Reardon Industries of Cincinnati, O., installers of Rockwool Insulation, recently, addressed a request to the Ohio Inspection Bureau in Columbus for a reduction in insurance rates for buildings having fireproof insulation.

It is the contention of the company that fireproof insulation materially reduces the risk of insurance companies.

## Georgia Marble Co. Building $250,000 Grinding Plant

Construction of a $250,000 grinding plant at Tate, Ga., for the processing of limestone was announced by James R. Cowan, president of the Georgia Marble Company. According to present plans, stated Mr. Cowan, the company officials expect the plant to be in production early next year.

Operations will be under the direction of John W. Dent, vice-president and general manager of the calcium products division of the firm.

• Before International Harvester's TD-24 crawler tractor began its demonstration at the Hodgkins Test Facility near Chicago, it was viewed and discussed by 75 visiting instructors of mechanical engineering. The demonstration was a part of the conference of teachers of diesel engineering held in Chicago under the auspices of the Diesel Engine Manufacturers' Association.

## W. T. Harvey Appointed To Natl. Lime Assn. Staff As Chemical Engineer

William T. Harvey, who recently completed an engineering course at the Virginia Polytechnic Institute and received his master's degree in chemical engineering, has joined the staff of the National Lime Association as a chemical engineer.

Mr. Harvey served for two years as a naval officer in charge of ship repair at various naval bases throughout the United States during World War II. His duties with the N.L.A. will consist of market research work, publicity and field work on the chemical and construction uses of lime.

## Chemical Industries Show Slated for December 1-6

During the first week in December the 21st Exposition of Chemical Industries will show the great post-war progress made in the chemically controlled industries, for all available space has already been taken on the four floors of the Grand Central Palace, exposition headquarters in New York City.

The show, staged by the International Exposition Company, is expected to be the largest of its kind ever held. Charles F. Roth is manager, and E. K. Stevens is associate manager.

## Phoenix Silica Company, Inc. Acquires Plant Near Louisville

The Phoenix Silica Company, Inc., is one of the newest of industries to be launched in the vicinity of Louisville, Ky. Several silica sand companies have been taken over by the firm in this area. The creamy-white sand, which has a silica content of 99 percent, has been shipped to glass manufacturers, foundries and fire brick concerns since 1890.

The latest operation to be taken over by Phoenix is about 50 miles from Louisville on the Illinois Central Railroad. Associated with Phillip J. McGovern, president of Phoenix, are Edward Hinkle and his brother, William F. Hinkle.

## Quarry Workers at Anna, Ill. Return After 3-Month Strike

Workers at the Anna Quarries, Inc., Anna, Ill., and the Charles G. Gilmore Asphalt Products plant at the same city resumed their jobs after a strike of three months. The settlement of a wage dispute ended with the signing of a contract guaranteeing the men at the quarries an hourly increase of 10 cents.

Although the Gilmore company was not involved, the plant was forced to shut down because it depends upon the local quarry for crushed stone.

## • Correction

The working week of the Standard Gypsum Company's plant at Long Beach, Calif., was erroneously given as "a 4-hr., 7-day-a-week schedule," in the September issue of PIT AND QUARRY, page 114. It should have read "24-hr., etc." Sorry!

## $21,000,000 Highway Plans Outlined for Massachusetts By Public Works Chief

Massachusetts Public Works Commissioner William H. Buracker has announced that a program calling for nearly 74 miles of new highway construction in Massachusetts at a cost of $21,286,000, half of which will be borne by the federal government, "will be well under way by the early part of 1948."

He stated that the type of highway provided in the new program "has unusual features based on traffic volume and turning movements." Divided highways will be built on main travelled thoroughfares, with at least two lanes in each direction, shoulders at least eight feet wide, and no provisions for left turns.

## U. S. Mines Bureau Station Attracts Many Visitors

Staff members of the U. S. Bureau of Mines make no pretense of having built a better mousetrap, but world scientists, industrialists, educators, engineers and even physicians do beat a path to their doors.

An analysis of the visiting list compiled during a recent routine month at one of the bureau's stations—the Central Experiment Station at Pittsburgh, Pa.—discloses that 121 persons called to request information on subjects ranging all the way from silicosis to wire rope.

Eleven of the visitors came from seven foreign countries — the Netherlands, French North Africa, England, Palestine, China, France and Switzerland. They requested and received facts on industrial hygiene, safety research, coal analysis and gasification, processes for producing synthetic liquid fuels, combustion reactions and many other subjects.

## Island Phosphate Shipments To Australia to Be Increased

Because production of phosphates on Nauru and Ocean Islands has been stepped up by the installation of modern machinery, Australasian farmers soon will receive double the quantity of super-phosphate now available.

According to Harold Gaze, British phosphate commission manager, Australia and New Zealand received 220,000 tons of phosphate from the islands during the year ending June 30, 1947.

The Fischer Lime and Cement Company, 41-year-old firm of Memphis, Tenn., opened its remodeled offices at Linden and Walnut streets in that city on September 6. The building was damaged to the extent of $100,000 a few months ago by a fire.

## Journal of Commerce Issues Booklet Explaining How to Sell to Uncle Sam

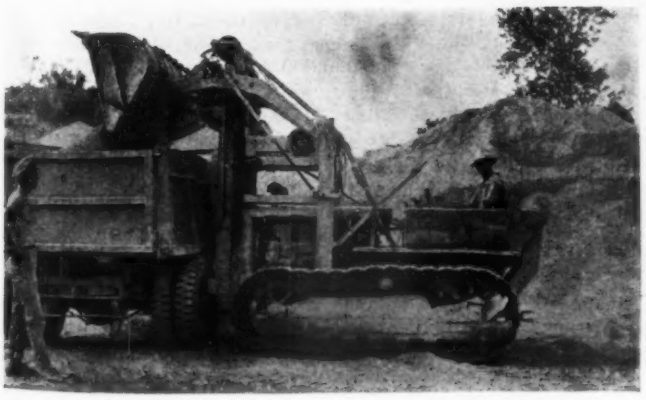
To help more businessmen get their share of sales in the $5,000,000,000 annual government market, the *New York Journal of Commerce* has just issued a new 32-page booklet designed to take the mystery out of bidding and contract procedures. The booklet is titled *How to Sell to the Government.*

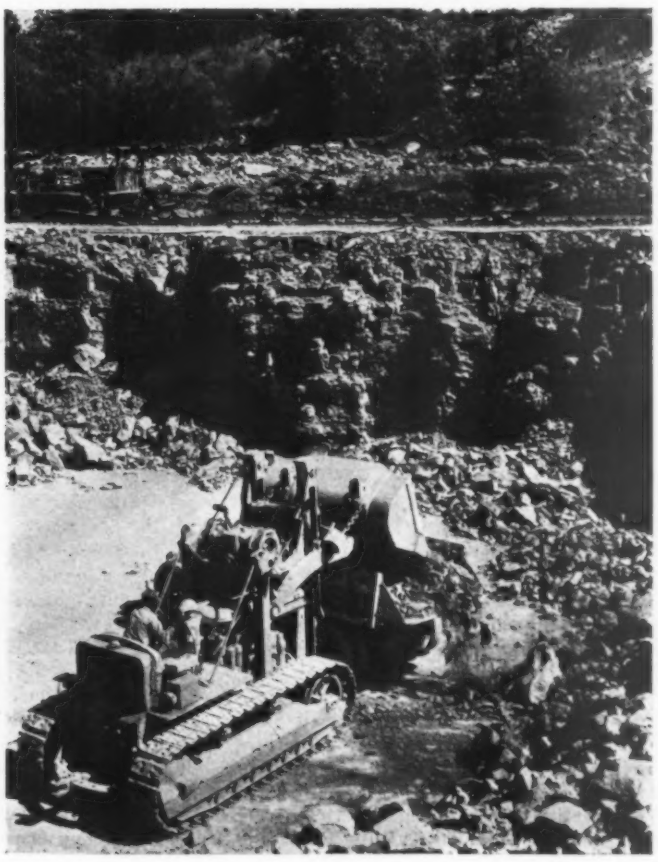
The booklet is a consolidation of a series of detailed studies made by the business newspaper on the federal, state and municipal markets of the nation. It is prepared as a guide to manufacturers, jobbers and dealers alike, and notes that more than 100,000 different items are bought each year by the country's many governmental agencies.

The fourteen chapters and many illustrations of *How to Sell to the Government* form a ready reference manual for the businessman who wants to reach this $5,000,000,000 customer. The booklet explains the nature of the various government markets and tells how to get on mailing lists for materials and products wanted. There are special sections devoted to the many agencies of the federal government, as well as to state and municipal governments. Copies may be obtained from the *Journal of Commerce*, 63 Park Row, New York 15, N. Y., at 50 cents each.

The recently-opened quarry of the Niagara Stone Company in the town of Niagara, N. Y., will be in full production in the near future, according to W. C. Olsker, an executive of the company.

• Pictured immediately below is a "Caterpillar" diesel D8 tractor, teamed with a LeTourneau bulldozer, at work stripping at the George W. Kerford Quarry Company's quarry, Atchison County, Kan. To the right is a scene showing a D7 tractor with a Trackson Traxcavator, loading rock into trucks to be hauled to the crusher. The unit hauls 160 t.p.h., working 20 hours per day; it is also used for stripping, dirt excavation, underground loading and other operations. The bottom picture shows a D4 tractor and a Traxcavator loading rock dust from a stockpile into trucks.





## Construction Totals Show Gains for East, Mid-West In Contraseasonal Trend

Sharp gains in contracts awarded last month for construction in the 37 states east of the Rocky Mountains were reported today by F. W. Dodge Corporation.

Particularly significant, a spokesman for the corporation said, was the fact that the August total of $823,216,000 was greater than the total for July or for June, thereby establishing a uniquely heavy contraseasonal unward trend. The August total was 25 percent greater than that for July and 21 percent greater than that for August last year.

The August volume of contract commitments was higher in all major classifications of construction than in July or in August of last year. Nonresidential building showed a gain of 15 percent over July and 37 percent over August, 1946. Residential volume was up 28 percent over July and 9 percent over August of last year, while public works and utilities contracts showed gains of 35 percent over July and 21 percent over August of 1946.

August building contracts in New England totaled $65,993,000, as against $40,168,000 in July. Residential commitments totaling $25,453,000 were 68 percent greater than in July and 61 percent higher than in August last year. Nonresidential volume in August totaled $18,115,000, a gain of 2 percent over July and a drop of 16 percent from August, 1946.

August contracts for metropolitan New York and northern New Jersey totaled $109,743,000, representing a 100 percent gain over July and 33 percent over August of last year. Nonresidential volume jumped 249 percent over July and 66 percent over August, 1946, while residential building increased 28 percent over July and 19 percent over August, 1946. Heavy engineering works gained by 143 percent and 7 percent over the previous month and the corresponding month of last year, respectively.

The August total volume of $20,687,000 for upstate New York was 20 percent lower than in July but 189 percent higher than in August, 1946. The nonresidential volume of $6,721,000 dropped 55 percent below July, but topped the August, 1946, total. Residential contracts totaled $5,959,000, a gain of 22 percent over July and 7 percent over August, 1946. Heavy engineering works contracts showed gains of 45 percent and 12 percent, respectively, over those of July, 1947, and August, 1946.

The contract total of $81,535,000 for the Middle Atlantic states was slightly above that of July and 2 percent below that of August, 1946. The nonresidential August contract volume amounted to $26,703,000, dropping 8 percent under the July total, but exceeding the total for August last year by 12 percent. Residential volume in August reached $39,184,000, reflecting a gain of 34 percent over July, and a decline of 6 percent from the August, 1946, total. Heavy engineering works declined 31 percent in August from the July total and dropped 11 percent from August, 1946.

The total August contract volume of $102,090,000 for the Southeastern states was 30 percent higher than in July, but was 11 percent lower than in August last year. Nonresidential construction contracts in August amounted to $30,638,000, showing a decline of 2 percent from July and a gain of 4 percent over August, 1946. Substantial gains were registered in August over July in residential contracts, but the August total of $52,451,000 was 11 percent lower than in August, 1946. Heavy engineering contracts totaled $19,001,000 in August, a jump of 30 percent over July and 15 percent over August, 1946.

The total valuation of August contracts for western Pennsylvania and West Virginia was $22,811,000, a slight gain over July, and a 36 percent gain over August, 1946. Nonresidential construction totaling $13,075,000 was 72 percent higher than in July and 122 percent above that for August last year. The residential total of $5,596,000 in August was 16 percent lower than that for July and 28 percent lower than that shown for August, 1946.

Total contracts in August for northern and eastern Ohio were $29,192,000, representing a 33 percent decline from July's level and 44 percent from that for August, 1946. Nonresidential contracts declined to a total of $8,479,000 and showed a drop of 57 percent from July and 58 percent from August, 1946. The August residential total of $16,701,000 was 2 percent over that for July, but was down 32 percent from August, 1946. Heavy engineering contracts totaled $4,012,000, down 45 percent from the previous month and 47 percent from the total for August, 1946.

In southwestern Ohio and Kentucky August contracts totaled $27,503,000, a gain of 24 percent over July and 23 percent over August, 1946. Nonresidential building was up 42 percent over July and 46 percent over August last year, the total for last month being $11,704,000. Residential contract volume of $9,200,000 was maintained at the same level as reported for July and for August a year ago.

Phenomenal contraseasonal gains were reported for southern Michigan in August, the total of $59,916,000 representing increases of 59 percent over July and 155 percent over August, 1946. Nonresidential awards totaled $21,106,000, reflecting an 83 percent gain over July and 163 percent over August, 1946. Residential awards totaling $27,406,000 were 40 percent higher than in July and 108 percent higher than in August, 1946.

In northern Illinois, Indiana, Iowa, Wisconsin, and northern Michigan awards in August amounted to $87,901,000. This volume was 21 percent above that of July and 3 percent higher than in August, 1946. Nonresidential awards totaled $36,583,000 and were 21 percent higher than in July and 7 percent higher than in August, 1946. Residential contracts totaled $80,290,000 in August, showing an increase of 6 percent over July and a decline of 11 percent from August, 1946. Heavy engineering project awards reached $21,028,000 in August, 53 percent higher than in July and 22 percent above August of last year.

In eastern Missouri, southern Illinois, western Tennessee and Arkansas the August total of $79,005,000 represented an 81 percent gain over July and one of 53 percent over August, 1946. Nonresidential awards increased to $22,063,000 from $10,439,000 in July and $9,350,000 in August, 1946. The August residential total of $11,340,000 was 25 percent higher than July's and 43 percent above the August, 1946, volume. Heavy engineering awards in August totaled $45,602,000, reflecting a gain of 90 percent over July and 33 percent over August, 1946.

Contracts awarded in Louisiana and Mississippi in August totaled $17,900,000, a decline of 3 percent from the July level, but a decided increase over August of last year, which was $9,868,000. The nonresidential August total of $7,498,000 was 32 percent higher than in July and 192 percent greater than in August, 1946. Residential contract commitments were 30 percent lower than in July and 47 percent lower than in August of last year. Heavy engineering awards amounted to $9,051,000 in August, a drop of 17 percent from July and a gain of 90 percent over August, 1946.

In Minnesota, North Dakota, South Dakota August awards of $26,450,000 were less than 1 percent higher than in July and in August of last year. August nonresidential contracts totaled $9,503,000, indicating a drop of 9 percent from July and a gain over August, 1946, of 43 percent. Residential awards totaled $7,945,000, as against $6,221,000 in July and $6,798,000 in August, 1946. Heavy engineering awards amounting to $9,002,000 in August were 5 percent less than in July and 28 percent less than in August, 1946.

August totals for western Missouri, Kansas, Nebraska, Oklahoma of $28,383,000 were higher by 27 percent over the total for the corresponding month of last year, but down appreciably from the $43,740,000 total reported for July. Nonresidential awards amounted to $7,884,000 in August, as against $23,165,000 in July and $8,786,000 in August, 1946. Residential awards showed great gains in August, the $13,257,000 total being 39 percent greater than in July and 129 percent higher than in August, 1946. Heavy engineering awards of $7,242,000 in August were 34 percent lower than in July and 6 percent lower than in August, 1946.

Building contracts for Texas awarded in August totaled $64,107,000, as against $50,030,000 in July and $30,214,000 in August, 1946. Nonresidential awards totaling $19,920,000 in August were 6 percent greater than the July volume and 134 percent higher than that of August, 1946. August residential awards totaled $19,768,000, as against $17,976,000 in the month immediately preceding and $14,005,000 in August, 1946. The August heavy engineering contract total of $24,419,000 was 85 percent higher than in July and 218 percent above the volume reported for August, 1946.

## Permanente Quarry Crew Given Holmes Award For Top Safety Record

Safety awards for the Permanente Cement Company's quarry operation crew in California were recently presented to William Knuth, quarry superintendent, by A. C. Blackman, chief of the Division of Industrial Safety for the State of California, and J. Howard Bird, engineer in charge of the U. S. Bureau of Mines station at Berkeley, Calif. (See illustration below.)

Permanente was honored by the Joseph A. Holmes Safety Association of the bureau for the following achievements: (1) for operating a quarry without a fatality since the beginning of operations in 1939; and for having no lost-time accidents from August 15, 1942, to January 1, 1947, (and continuing) with an average 27 employees handling 6,922,975 tons of material while working 283,200 man-hours; (2) for having operated 73,200 man-hours with an accident-severity rate of no days lost for each 1,000 man-hours worked during the calendar year, 1946.

According to Mr. Bird, the Permanente quarry has "the outstanding safety record for the entire country." The awards were made at a dinner honoring the crew of the plant. The company recently expanded its operation to a capacity of 5,500,000 barrels of cement annually.

## Compressed Air & Gas Institute Issues Book on Air Power

*Compessed Air Handbook,* a 400-page volume published by the Compressed Air and Gas Institute, New York, N. Y., was intended to serve as a reference text on applications, installations, operation and maintenance of compressing equipment and air-powered tools of all types.

The *Handbook* represents the collective knowledge, experience and thought of the 19 member companies of the Compressed Air and Gas Institute and was compiled over a two-year period as a joint activity of the institute's educational and technical committees. Price: postpaid, anywhere in the United States, $3.00 per copy; $3.50 elsewhere.

## Industrial Press Relations Discussed at Advertising Panel

A panel of outstanding business publication editors tipped off Milwaukee admen on "How to obtain good industrial press relations" at the monthly meeting of the Milwaukee Industrial Marketing Association.

The president of the association, Art Tofte, pointed out that in industry it generally becomes the job of the advertising man to help make his company's press relations effective. Norm Jacobson acted as moderator for the panel discussion.

## Missouri's Lime Industry In $5,000,000-a-Year Class

Missouri's lime production has grown into a $5,000,000-a-year industry, and the state currently ranks third in the United States in this field. Missouri's output accounts for 13 percent of the nation's total annual lime production.

In 1945 Missouri had 10 active plants, which produced 745,000 tons of lime, valued at $5,031,000. Only Ohio and Pennsylvania outrank Missouri.

# Expansion of Research Program Stressed by N. L. A. Directors

**By WALTER E. TRAUFFER**

MANY important problems confronting the lime industry were discussed at the meeting of the board of directors of the National Lime Association at The Homestead, Hot Springs, Va., on September 29 and 30, 1947. Action was taken on most of them, including the dates and places of coming meetings and further expansion of the already-impressive research program. Most of the board members were present, and the weather was excellent.

H. D. Brigstocke, chairman, presided at the meetings. Mrs. Roma Medford Turpen, secretary, expressed the appreciation of the board to K. L. Hammond for his work as chairman, and presented as a token of appreciation a cigar humidor on which were engraved the signatures of all the board members. Also exhibited were the certificates of honorary life membership which are to be presented to S. Walter Stauffer and Nathan C. Rockwood.

The routine business reports were then presented by Robert S. Boynton, general manager, who stated that the association is in a healthy financial condition and that its membership is growing.

It was decided that the next annual meeting of the association will be held April 4, 5 and 6, 1948, at The Homestead. Some operating discussions will be held at this meeting. The date and place of the next operating meeting was not decided but it will probably be held in Cincinnati in January, 1948, with a board meeting in connection. This will be exclusively an operating meeting.

The board also heard complete reports of the progress being made on research at Massachusetts Institute of Technology, Rutgers University, etc. It was voted to expand the research program, especially at M. I. T., and a substantial additional sum was added to that appropriated at the last meeting.

The subject of lime soil stabilization has aroused much interest as a promising potential market and, as a result of investigations made by the association, it was voted to accept for one year the offer of Professor K. B. Woods of Purdue University to carry on a research program on all phases of this subject. Future research plans are to be determined at a later meeting. A sample of stabilized pavement from Texas was exhibited and all were impressed by its quality, which compared favorably to much more costly cement concrete. It was stated that this type of road requires about 100 tons of lime per mile.

The board unanimously voted against the proposed formulation of a uniform chemical lime sales contract, holding that it would be an improper function of the association as it might restrict free competition.

• William Knuth, Permanente quarry superintendent (right), is presented with the Holmes Award by A. C. Blackman and J. H. Bird.

# New 3-M Granule Plant at Little Rock Easily Rates As Finest In Industry

another ON THE SPOT report

THE adjective department of PIT AND QUARRY finds itself hard pressed to come up with a sufficient number of adequate superlatives to describe a new plant which we were privileged to study and photograph at Little Rock, Arkansas, several weeks ago. A long, low whistle is a typical reaction among those who see for the first time Minnesota Mining and Manufacturing Company's new roofing granules plant at Little Rock, for here seems to be that rarest of achievements in industry — a plant that has benefited to the utmost and in every conceivable way from modern engineering design.

**By WILLIAM M. AVERY**

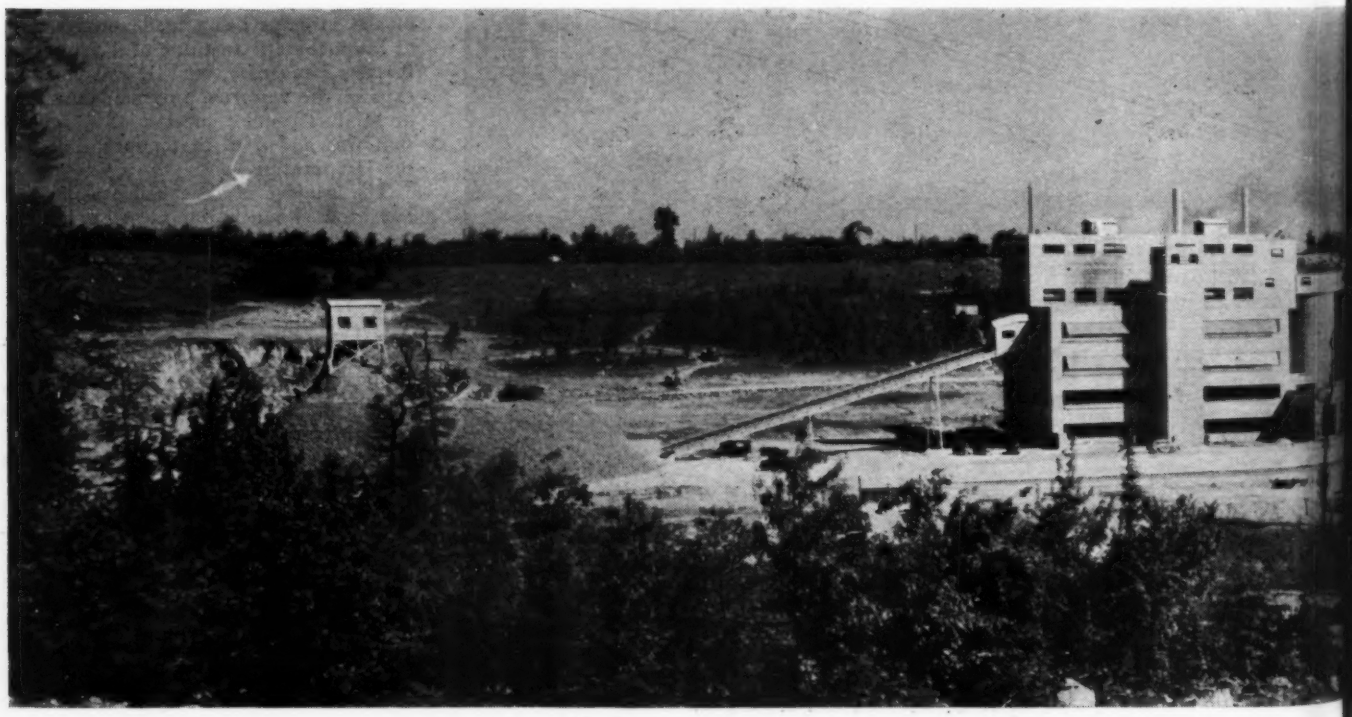
Although there is no radical departure from conventional processing methods, the new plant is automatic to a far greater extent than any similar installation in the country, and according to the local management one of its outstanding features is the ease with which uniformly top quality granules can be produced. When the second of the two units incorporated in the original design goes into operation within the next week or two, the Little Rock plant will have a productive capacity of approximately 250,000 tons of colored granules per year, or enough to weatherproof the roofs of 900,000 homes. This capacity figure, already well substantiated by the performance of the first unit of the plant (on which production began on April 24 of this year), represents a substantial increase over the original designed capacity of 200,000 tons annually, and is in itself a remarkable indication of what can be achieved with modern high-efficiency equipment.

A number of factors entered into the selection of Little Rock as the location for this important new unit in 3-M's manufacturing facilities. The high quality of the syenite rock found there was probably the most important consideration. The deposit at Little Rock has all the characteristics necessary for manufacturing top quality roofing granules — hardness, toughness, and opacity. The material takes readily to color and it fractures into granules of the proper shape for roofing purposes. Extensive prospecting operations throughout the South indicated that the Little Rock deposit, known locally as Granite Mountain, was by a comfortable margin the best available.

Little Rock is also strategically located to serve the increasing demands of the company's Southern roofing customers, who were formerly supplied by 3-M plants located in the North. Faster deliveries and materially lower freight costs have resulted. Other important advantages inherent in this location are excellent railway service, low utility costs, the availability of natural gas, a plentiful supply of manpower and a climate that assures year-around operations without major interference from the weather. According to the Little Rock Chamber of Commerce, the sun shines 281 days in an average year.

The $3,000,000 plant and associated operations at Little Rock, an important step in 3-M's long-range expansion program, covers an area 950 feet long and 350 feet wide, or about eight acres. About 150 acres of surrounding property have been purchased to assure an adequate supply of syenite rock for at least a century, and the company is still gradually acquiring more. At various locations the deposit has been

• A general view of the Minnesota Mining & Manufacturing Company's new $3,000,000 roofing granules plant at Little Rock, Ark. When all units are in full operation, this modern plant is expected to produce about 3,000,000 tons of colored granules per year. Material flows from the primary crusher and raw storage pile at the left through the crushing and screening building (center) to the coloring section and finished-product storage silos at the right.



core drilled down to a depth of 110 feet, and there are clear indications that the quality of the syenite, particularly with respect to increased density, improves at greater depths. At present the top layer of stone is being removed on an 80-foot face. When this phase of the operation has been completed, a second level of undetermined depth will be worked.

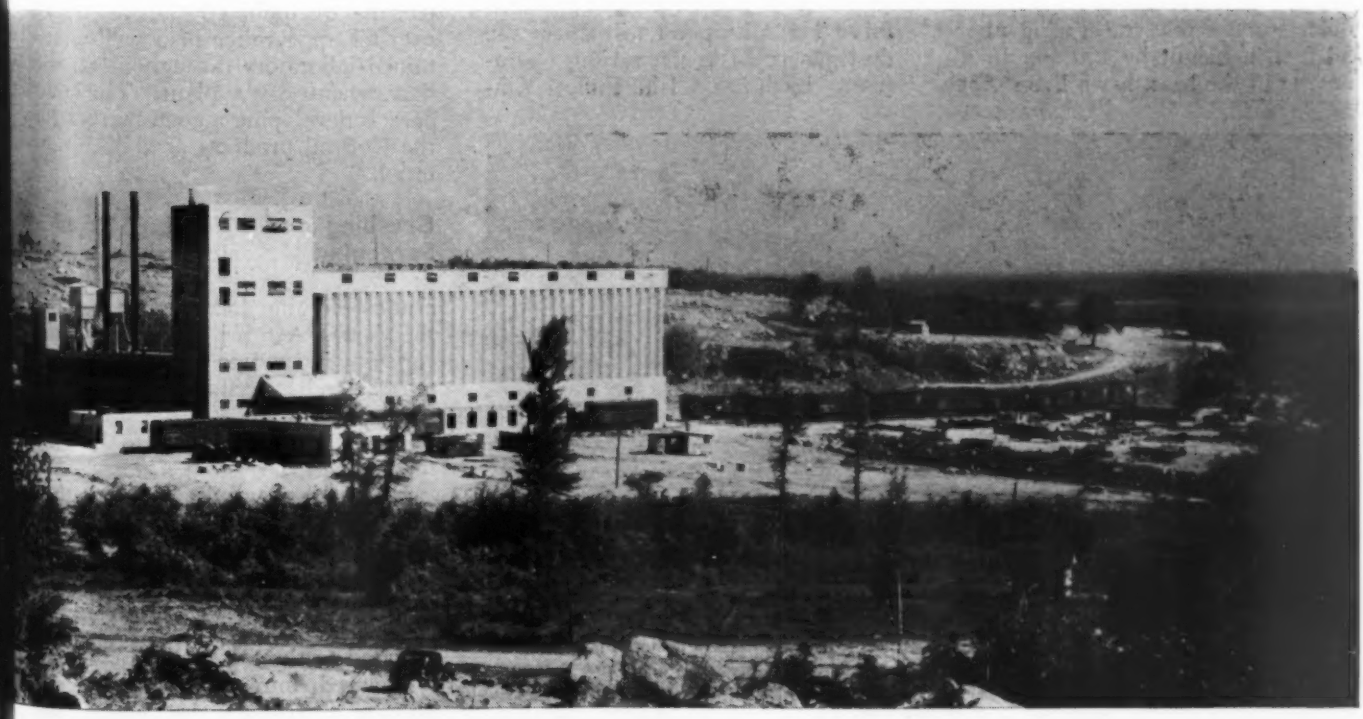
**Stripping** Two methods are used for stripping the overburden, which varies from nothing to the maximum of about five feet. The heavier deposits are removed with a 1½-cu.-yd. Lima shovel and hauled to spoil piles with a 15-ton Euclid truck. The lighter deposits are shoved aside by a "Caterpillar" RDH tractor equipped with a Le Tourneau XD8 bulldozer. Both the shovel and the bulldozer are also used extensively in the quarry proper for cleanup work.

**Drilling and Blasting** Primary drilling is done with two Bucyrus-Erie 29T blast hole drills. Using 20 to 22 feet of burden, from 8 to 16 holes, spaced 25 to 27 feet apart, are drilled to a depth of about 45 feet below the floor of the quarry. The 10-in.-diameter holes are drilled with 9-in. bits, which are reconditioned in the plant shop with a Bucyrus-Erie No. 12BD bit dresser.

From 3 to 7 tons of explosive is consumed in each primary blast. Most blasts are fired instantaneously, but some use has been made of time delay caps with double- and triple-row shots. Due to the formation of the deposit, with seams tilted at many different angles, a considerable amount of secondary blasting is required to reduce the syenite rock to the proper size for the primary crusher. Ingersoll-Rand jackhammers, driven with air supplied by a 315-c.f.m. Chicago Pneumatic compressor, are used for this secondary drilling. An effort is made to hold the maximum cross-sectional dimension of individual rocks to about 40 inches, although they may be much longer than this without causing trouble at the crusher.

• The men who were responsible for the design and construction of the 3-M granule plant at Little Rock. Seated, left to right: G. W. Swenson, manufacturing manager, Roofing Granule Division; L. A. Hatch, vice-president in charge of the Roofing Granule Division; A. L. Nienaber, superintendent of construction of the Little Rock plant. Standing, left to right: W. E. Vroman, Roofing Granule Division engineer; W. A. Thomas, chief engineer in charge of design of the Little Rock plant and equipment.

**Recovering and Hauling** The rock is picked up from the quarry floor by an 85-B Bucyrus-Erie electric shovel, equipped with a 3¼-cu.-yd. bucket, and dumped into 12-ton haulage units. Of the five units now in operation, three are Easton TR-10H trailers drawn by International KH gasoline tractors, and two are diesel-powered Model HB-1 Euclids. All the units are dumped hydraulically, the Eastons from the side, the Euclids from the end. The round-trip distance from the present working face of the quarry to the primary crusher is approximately 2,500 feet.



**Primary Crushing** The Traylor 42-in. Bull Dog gyratory crusher has a capacity of 550-t.p.h. with a 4-in. setting. The two 125-hp. G. E. motors, which drive the crusher through Texrope V-belts, are mounted on Rockwood motor bases, with extensions connected to hydraulic dash pots to take up surge when the load hits. The dash pots and an automatic circuit breaker actuated by an oil pump driven off the crusher shaft are protective features developed by 3-M's own engineering staff.

The primary crusher, which is entirely below the level of the roadway, is housed in a reinforced-concrete structure under the feed hopper. The room which houses the crusher, drive motors and controls is outstanding for the generous amount of clearance allowed on all sides. The equipment is protected from dust by keeping pressure on the room whenever the crusher is operating. This is done with a Buffalo-Force fan which draws air through an American automatic self-cleaning filter and discharges it into the room. The dust generated at the primary crusher is at present being exhausted through a stack, but eventually the company plans to install some sort of precipitating equipment at this location.

**Raw Storage** From the gyratory crusher the syenite rock (this means simply an igneous rock, chiefly feldspar, containing only small amounts of impurities) drops onto a 42-in. belt conveyor which elevates and discharges it into a 5,200-ton raw storage pile. This open storage pile, measuring about 50 feet in height by 100 feet in diameter at the base, has a live storage capacity of about 1,800 tons. It is centered over a reinforced-concrete reclaiming tunnel. Four Jeffrey 24- by 90-in. vibrating feeders permit the 4-in. rock to flow freely onto the No. 2 belt conveyor, which is 30 inches wide and has a capacity of 135 t.p.h. at a speed of 300 f.p.m. Tramp iron is removed from the flow by means of a magnetic head pulley.

**Secondary Crushing** The entire flow passes into a 4¼-ft. Symons standard cone crusher which is the first unit in the plant proper, although in the flow sheet of the plant it is designated as a part of the crude crushing system. This secondary crusher, which is set at 1 inch, operates in closed circuit with a 5- by 10-ft. single-deck Tyler Ty-Rock vibrating screen. The plus 1-in. rock flowing from the screen back to the crusher constitutes a circulating load of not over 50 percent.

**Drying** The minus 1-in. rock flows by gravity from the screen into the 102-in. diameter by 50-ft. long gas fired rotary dryer. The dryer rotates at ⅜ r.p.m. and is set on a slope of 1 inch per foot. Operating at a temperature of about 150 deg. F. (recorded at the discharge end), it reduces the moisture content of the rock sufficiently to effect a 2 percent loss in weight. A 20-hp. compressor supplies air to the unit.

**Electric Precipitators** At the discharge end of the dryer is the first of four Cottrell electric precipitators which are located at strategic points throughout the plant to recover the dust generated in the various operations. Each has a 4-in. Fuller- Kinyon pump for conveying and disposing of the precipitated dust.

The precipitator at the dryer is an 8-duct unit with a capacity of 16,000 c.f.m. for dust recovery at such critical points as crushers, screens, elevators and conveyors. The fourth unit, a 6-duct precipitator with a capacity of 10,000 c.f.m. is located in the coloring plant.

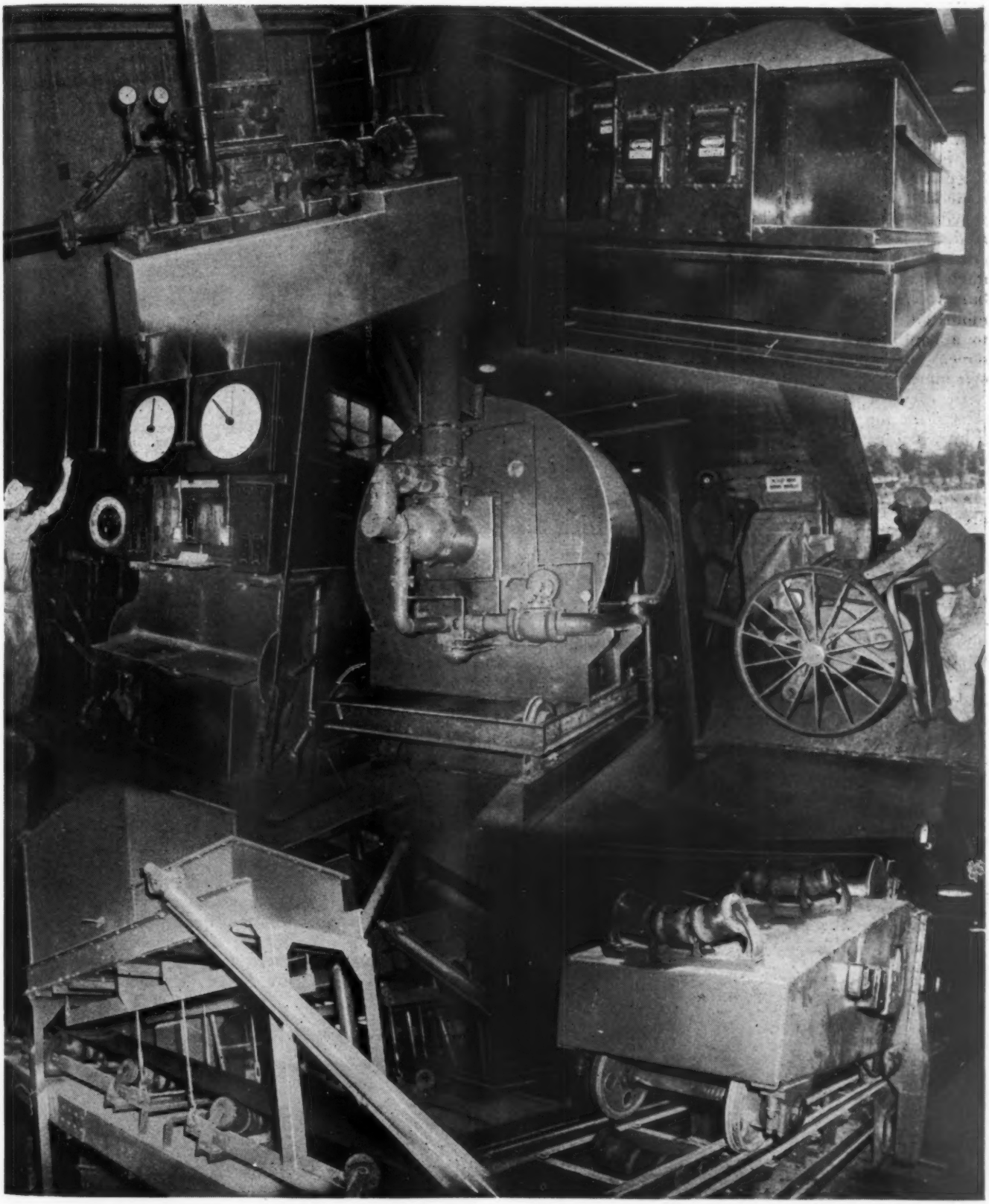
• T. R. Bosley (left) is supervisor of quality, and W. J. Aitken Sr. is quarry superintendent.

As a result of these extensive provisions for collecting and handling dust, the 3-M plant at Little Rock is by all odds the cleanest crushing and screening operation we have ever had the pleasure of visiting. Except for the silos and other telltale features of the building design, one might suppose that the plant housed a watch factory, so clear and clean is the surrounding atmosphere at all times. Inside the effect is even more startling, for good plant housekeeping and efficient dust control have combined to create the over-all appearance of a well-maintained laboratory throughout all the departments of the plant. The company is developing a good market for the Cottrell products as a filler material.

**Crushing and Screening** The dried rock is elevated and stored in two 1,000-ton crude feed silos located just beyond the dryer. A third silo of the same capacity is used to store dust from the Cottrell precipitators, and the fourth unit is used for the storage of mill-run fines which are to be further processed.

It is at these crude feed silos that the flow of material is first split into two parallel streams which supply the separate (but identical) crushing and screening circuits. In each circuit the rock is conveyed and elevated to the top of the plant and discharged into a mechanical revolving distributor by which the

• Some of the key personnel at Little Rock are, left to right: Robert Miller, plant chemist; T. B. Neikirk, plant superintendent of production; W. E. McCollom, assistant office manager; E. F. Schrader, assistant to the sales manager; and W. H. Walters, assistant superintendent of production.



• Top row, left to right: One of the four 4-in. 20-hp. pumps which convey dust from the electric precipitators to the storage silos. Each operates in conjunction with a 20-hp., 232-c.f.m. compressor.

• One of the four electric precipitators which are located at strategic points throughout the plant to recover dust generated in the various operations. This 8-duct unit, only a part of which is shown, has a capacity of 16,000 c.f.m.

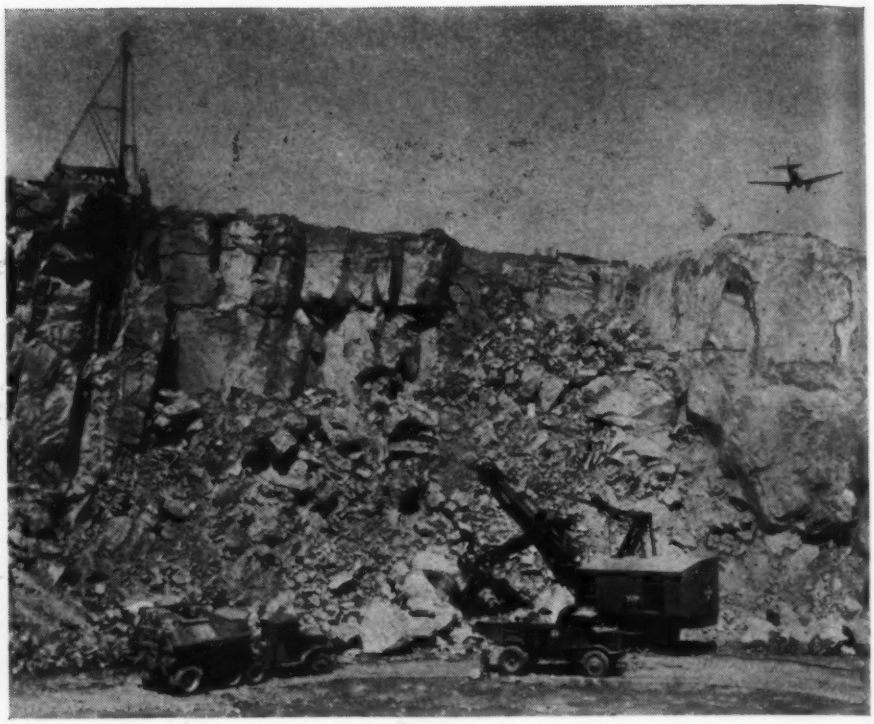
• Center, left to right: A view of the mixer station at the No. 1 coloring unit. Here pigments, certain chemicals and other raw materials are added to the granules in preparation for mixing.

• The firing end of one of the 84-in. by 50-ft. gas-fired rotary kilns in which the colored granules are subjected to a carefully-controlled heat treatment.

• The colored granules are loaded into box cars with two high-speed belt loaders. These units are fed by chutes from 24-in. conveyors under the storage tanks.

• Bottom, left to right: A part of the complex system of controls consists of weighing meters of the type shown here. These are installed on belt conveyors at numerous points throughout the plant.

• One of the belt trippers which discharge finished granules into the storage tanks.



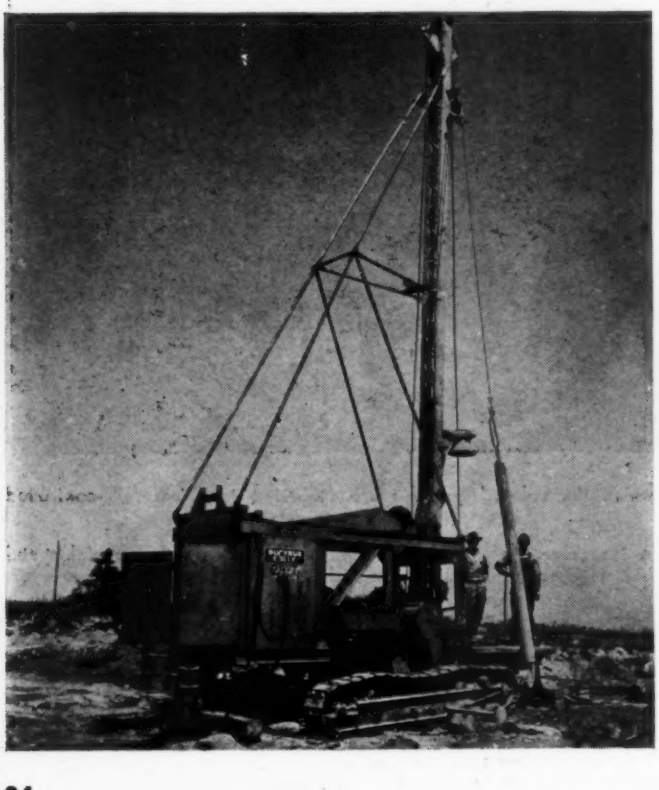
• This view of the 80-ft. quarry face shows, from left to right: one of the blast hole drills operating on the rim; a side-dump trailer waiting to move up to the shovel; an end-dump truck being loaded; and the electric shovel. We included the large transport plane just for luck.

flow is divided among four 40- by 120-in. 3-deck No. 50-SP Orville Simpson Rotex screens. Over-size material (plus No. 3 mesh) goes by gravity to a 60-ton surge bin which feeds a 4-ft. Symons short head cone crusher; minus No. 3 plus No. 6 mesh goes into another 60-ton surge bin which feeds the roll crusher; minus No. 6 plus No. 28 mesh goes to a bank of four finishing Rotex screens on the level below the scalpers; minus 28-mesh goes to waste.

In each of the finishing Rotex screens the top deck is No. 11 mesh, from which oversized material flows by gravity back to the roll crusher. The second deck is a No. 14 mesh screen which is used only as a breaker screen, the product joining the plus 28-mesh as finished material. As in the case of the scalping screens, the minus 28-mesh rock goes to waste. Both the cone crusher and the 42- by 16-inch Traylor Wausau roll crusher which is used for final crushing operate in closed circuit with the upper bank of screens, and each is fed by a d.-c. control feeder of the company's own design. The roll crusher, which is also a 3-M design, is set at about 3/32 of an inch, carries a circulating load of about 150 percent.

Sample gates and spouts at each section of every Rotex screen facilitate the very close control necessary in the processing of roofing granules. Throughout the screening, conveying and elevating units have been so arranged that any bank of Rotex screens can be shut down without shutting down the entire plant. The eight Rotex screens in each circuit are arranged in four banks of two screens each, each bank consisting of one scalping and one finishing unit. Because of the parallel arrangement of the two circuits it is also possible to make two distinct products simultaneously. Starting with the initial conveyors and elevators, the entire system is electrically interlocked so that if any one unit stops, the entire circuit stops operating. The finished No. 11 mesh rock from each screen flows to a single chute and drops by gravity to one of the two raw granule conveying and elevating systems.

**Granule Storage** The raw granules are stored in two concrete silos, each divided into four segments of 400 tons live storage capacity. Division of the two silos into eight sections makes it possible to blend the feed to the coloring plant, assuring much greater uniformity in quality than would other-



• Left: A closeup of one of the blast hole drills with which 10-in. holes are drilled to a depth of 45 feet below the quarry floor. The 9-in. bits are reconditioned with the bit dresser.

• Right: A view of the bit dresser. The 9-in. bits are prepared by heating them in the furnace at the left.

wise be possible. The silos are so arranged along a railway siding that any end product may be loaded into cars at this point, thus short-circuiting the coloring operation. The silos are set over a concrete tunnel into which the raw granules flow onto a 24-inch belt which feeds the coloring plant.

Beyond this point the flow is again split into two parallel streams feeding the Nos. 1 and 2 coloring units. These entirely separate and independent coloring units are fed from two 75-ton surge bins.

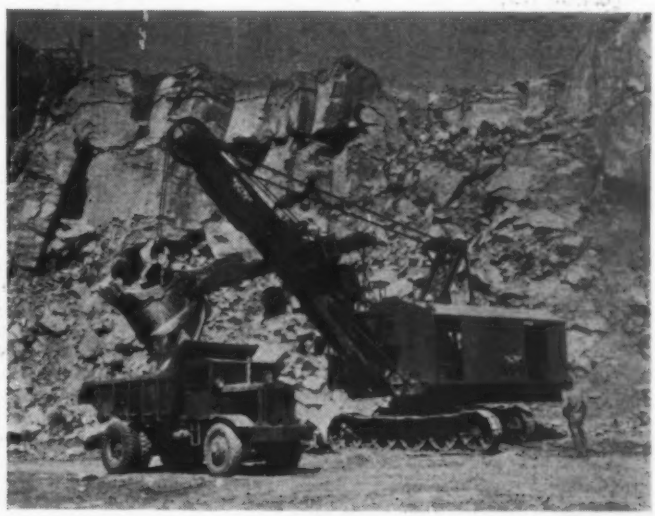
**Coloring** The coloring process is a batch operation. From the surge bins the raw granules are conveyed to a mixer station where pigments, certain chemicals and other raw materials are added in carefully measured amounts. The mixing in each coloring unit is done with two 84-cu.-ft. T. L. Smith tilting mixers.

The raw mix is discharged into 5-ton hoppers and conveyed and elevated to 84-inch by 50-ft. gas-fired rotary kilns. These d.-c. controlled variable-speed kilns, operating at comparatively high temperatures, prevent fading by fixing the colors permanently in a strong bond. From the kilns the colored granules flow directly into 72-in. by 52-ft. constant speed rotary coolers.

The finished product is elevated from the coolers to a battery of three Rotex screens, where a final scalping operation is performed to take out oversize, clinkered material and to remove any remaining trace of fines. No split is made in the finished product.

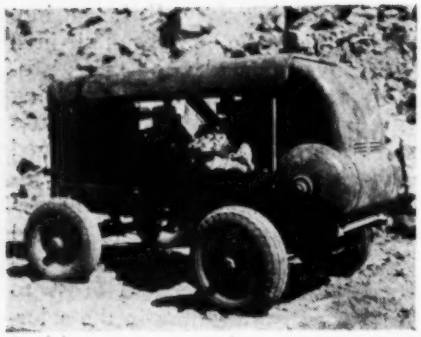
**Storage and Shipping** The finished product storage system consist of 134 tanks of 55-ton capacity each, arranged in four parallel rows. Two 18-in. belt conveyors with trippers are so located that they may discharge into any of the tanks. Twenty-four-inch belt conveyors under the tanks provide for almost unlimited blending in the process of loading cars. Rates as high as 160 t.p.h. may be obtained with these loading conveyors. Although the tanks have sufficient elevation so that cars might be loaded directly from a single tank, blending is always practiced in order to minimize any variations in the color, quality or grade of the finished granules.

From the loading conveyors the granules flow by gravity to Stephens-Adamson high-speed belt loaders which can throw the material to either end of a boxcar from the doorway. Two of these machines are in operation and each can handle up to 160 t.p.h. Cars are loaded on a one-shift basis, about 45 minutes being required per car. A Union Specialty one-spout bagger is avail-



• Upper left: A side-dump trailer being loaded by the electric shovel. There are three of these, all drawn by gasoline tractors.
• Right: Two of the five haulage units are end-dump diesel-powered trucks of the type shown here. Like the trailer units, they are dumped hydraulically.

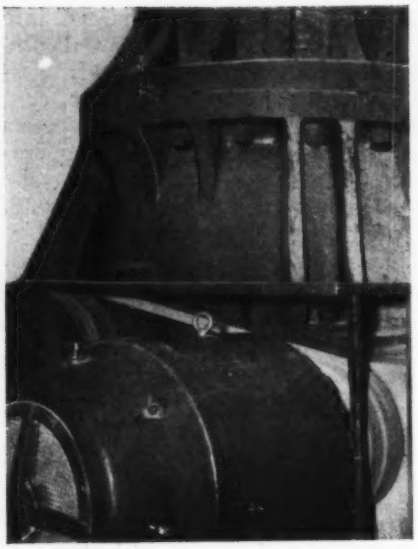
• Lower left: Some of the stripping operations and cleanup on the floor of the quarry are handled with this tractor-bulldozer.
• Right: Drilling for secondary blasting is done with jackhammers. Due to the formation of the deposit, much of the material brought down in primary blasting is too large for the gyratory crusher.



• Air for the extensive secondary drilling operations is supplied by this 315-c.f.m. portable compressor.

able for bagging small quantities of material on special orders.

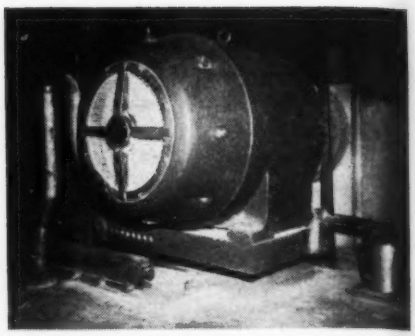
**Quality Control** Rigid control of quality is maintained by a well-equipped laboratory, conveniently located so that material in process and finished materials in cars can be checked continuously. Stone is checked at the quarry, in the crude storage pile, in the crushing and screening section, at the mixer stations, at the discharge ends



of kilns and coolers, and both in and out of storage tanks. Off-standard materials are immediately segregated in special compartments of the raw granule storage silos.

Although the entire organization, comprising some 150 employees, is quality conscious to an unusual degree, eight men under the plant chemist devote all their time to the important question of quality control.

As an additional measure of quality and production control, Merrick



• Center: Primary crushing is done in this 42-in. gyratory. The two 125-hp. motors are connected to the countershaft with multiple V-belts.

• Above: A closeup of one of the drive motors on the primary crusher, showing the trunnioned drive base and a special dash pot (right), which takes up the surge when the load increases suddenly.

Weightometers are installed at strategic points throughout the plant. These units are found at the No. 2 conveyor from the stockpile to the secondary crusher, at the conveyors which carry finished No. 11 grade granules from the crushing and screening department between the

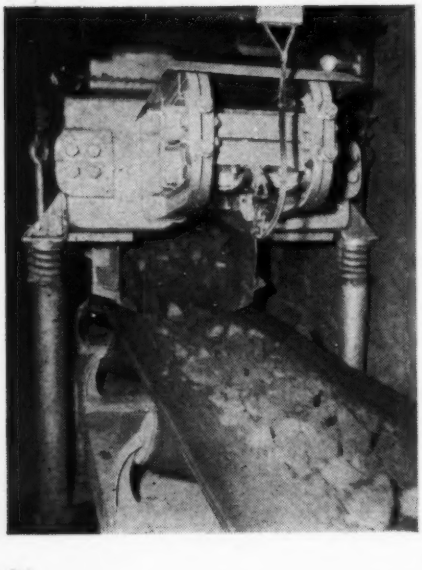
• Left: The 42-in. belt conveyor which takes the 4-in. rock from the primary crusher to the raw storage pile.

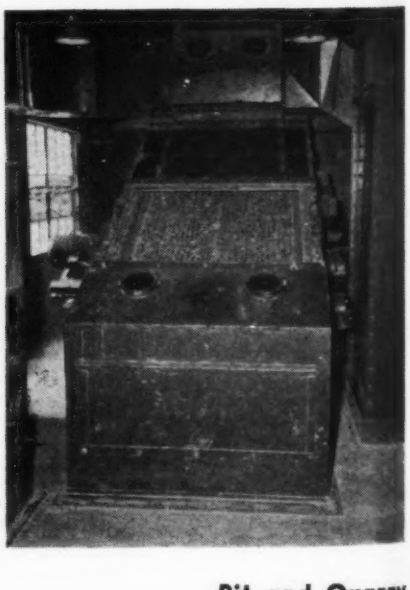
• Right: Air pumped into the primary crusher room is drawn through this automatic self-cleaning filter. Similar filters are used on the intakes of the three heating units in the plant proper.

• Below, left: One of the four 24- by 90-in. vibrating feeders which feed material from the raw storage pile onto the 30-in. belt conveyor in the reclaiming tunnel.

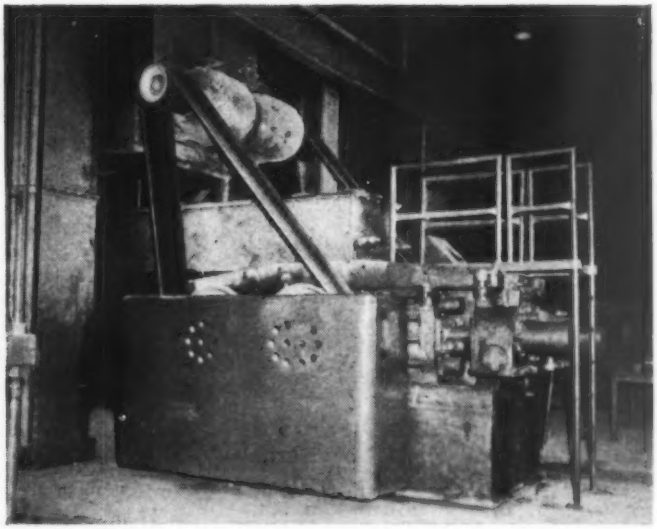
• Center: All the rock passes through this 4¼-ft. cone crusher for secondary reduction. The unit has a 1-in. setting.

• Right: The 5- by 10-ft. single-deck vibrating screen is in closed circuit with the secondary crusher.





• The upper unit in each crushing and screening circuit consists of four shaker screens. Rubber balls are used in each compartment of these units to facilitate flow and to prevent blinding of the screens.

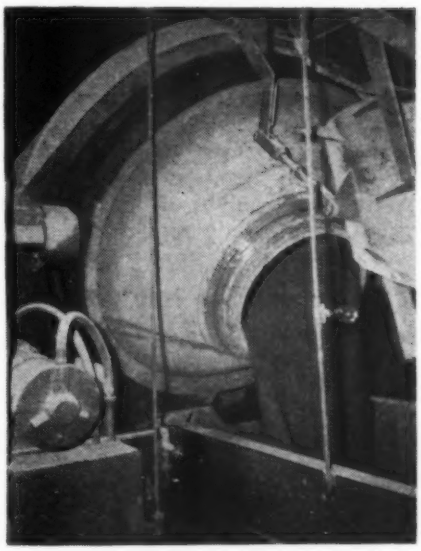


• The 42-in. roll crushers, which were designed and developed by Minnesota Mining and Manufacturing Company engineers, carry a 150 percent circulating load.

raw granules storage silos and the coloring plant and at each of the three conveyors which feed colored granules to the finished storage tanks. A similar check is also made on all mill-run fines or waste material. Currently the plant is showing a yield of about 50 percent; *i.e.*, 1,000 tons of stone from the quarry is producing 500 tons of finished granules. Ultimately it is expected that all the material fed to the plant will be marketed in some form or another.

**Building Features** The massive plant buildings are of reinforced concrete and steel design throughout and they present an unusually streamlined and attractive appearance inside and out. In the crushing and screening section there are eight distinct levels of operation, three below grade and five above. On three of the main operating levels, entire exterior walls may be thrown open by means of mechanical gang-operated windows—an especially desirable provision for summer temperatures in Little Rock.

Two Dravo fully-automatic gas-fired heating systems assure comfortable temperatures in the crushing and screening building during the winter months, and a similar system operates in the coloring plant. These units draw outside air through American automatic self-cleaning air filters, and through the summer months they are operated with the blowers alone to create more comfortable temperatures throughout the buildings. We can personally vouch for the fact that the effect is very much like air conditioning, for we found (on a re-



• One of the 84-cu.-ft. tilting mixers discharging a 5,000-lb. batch of colored granules. The coloring process is strictly a batch operation.

spectably hot day) very few points in the plant that weren't bathed with a stream of cool, clean air from overhead outlets. Gas-fired unit heaters are spotted at frequent intervals throughout the warehouse, machine shop, stock room and locker rooms. These sections and the office building are protected by automatic sprinkling systems.

There are three elevators in the plant—a freight unit in the 8-level crushing and screening building, and two man-lift units in the coloring division. They are all fully-automatic Lee-Hoff installations. The modern air-conditioned offices are housed in a separate one-story building adjoining the plant proper.

With a few minor exceptions, electrical equipment in this important new unit of 3-M's manufacturing facilities was furnished by the General Electric Company. All elevators, conveyors and rotary equipment (including dryers, kilns and coolers) were built by Bartlett and Snow. More than 25 conveyors, varying in width from 18 to 42 inches, are used throughout the plant. They have an aggregate center-to-center length of more than 2,000 feet. With one exception, the belts for this very extensive conveying system were all furnished by the Hamilton Rubber Manufacturing Co. V-belt drives, which predominate throughout the plant, are Allis-Chalmers Texropes.

**Administrative Personnel** Operations of the Little Rock plant come under the supervision of 3-M's L. A. Hatch, vice-president in charge of the roofing granule division, G. W. Swenson, manufacturing manager, and A. D. MacNutt, technical director, all of whom make their headquarters at the company's main offices in St. Paul, Minnesota. The plant was put into operation with the help of experienced production laboratory and administrative personnel from 3-M's St. Paul, Wausau and Coplay divisions. A number of experienced men have been permanently transferred from these divisions to carry on the operation of the new plant.

T. B. Neikirk, superintendent of production at Little Rock, and W. H. Walters, assistant superintendent of production, both came from 3-M's granule plant at Copley. E. F. Schrader, assistant to the sales manager, and W. J. McCollom, assistant office manager, are both now permanently located at Little Rock. Robert Miller is plant chemist and W. J. Aitken Sr. is quarry superintendent.

(*Continued on page* 110)

# Screenings

BY *William M. Avery*

OUR British contemporary, *Mine and Quarry Engineering*, recently doffed its cap in our direction with the following comment:

"We feel flattered that an American contemporary has also started a regular feature under the name of *Screenings*. This section of our contemporary . . . has a somewhat different mesh from ours of the same title. While our *Screenings* is only some six months older we permit ourselves an avuncular interest in the new feature and wish it every success."

It's something of a load off our minds to find our inadvertent plagiarism so graciously forgiven, and we like the reference to a "somewhat different mesh." Perhaps the "avuncular" relationship is satisfactory, too, but we think some clarification is indicated. According to our understanding of the term, it could imply that our overseas counterpart is either our uncle or our pawnbroker. Spare uncles spotted here and there can be very handy, especially in these days of uncertain hotel accommodations, and we would welcome this addition to our list. But we have definite misgivings about the pawnbroker connotation. Somehow we just can't imagine its working out very satisfactorily. Putting up a ten-dollar bill for a shilling loan wouldn't help us much just now, and anyway Uncle Sam will be glad to fork up without the shilling. Many thanks just the same.

### Alas! Poor Kippy

NOT long ago we spent a pleasant day as the guest of Hal G. Knight, general manager of the Rubber City Sand & Gravel Company at Akron. Just outside the windows of Mr. Knight's office we noticed two well-kept graves, complete with concrete head stones and picket fence enclosures. We had visions of some ancient tragedy involving an unsuccessful trip through the primary crusher by previous operators of the plant, with burial on the site as a vivid warning to others who might contemplate a similar experiment.

These daydreams were shattered, however, when it was explained that the graves marked the last resting place of Kippy and Billie Boy, beloved canines of Mr. Knight and K. G. Harris, traffic manager. A small cherry tree (see cut) stands between the graves, presumably just in case two members of the canine spirit world might, from force of habit, occasionally require the services of a tree.

### Rain Makers Get Hay Maker

NOW that they've succeeded in making rain by spraying powdered dry ice into likely looking clouds, a search is on for other materials for producing assembly-line weather. The Australian council for scientific and industrial research and the R. A. A. F. are reported to be experimenting with calcium chloride for this purpose. Seems that dry ice works only on cumulus clouds at certain altitudes, whereas it is believed that calcium chloride will wring water out of any old cloud that happens to be lurking around.

We can see several distinctly bright spots in the rain-making outlook. For one thing, it might discourage after-dinner speakers, writers of convention papers and others from quoting the ghastly bromide that Mark Twain is alleged to have originated concerning the weather. If Mark ever made that dismal crack (which we doubt), we think he's been tortured more than enough for it.

When the general public gets around to accepting the notion that rain can be manufactured, the Los Angeles Chamber of Commerce should have a considerably easier task explaining "unusual weather" to visitors. It can always mutter darkly that sabotage planes, sent out by the Miami Chamber of Commerce, are operating in the stratosphere.

Aside from the fact that induced rain seems almost never to fall where the makers intend, we've noticed only one little sour note in the whole picture. The other day at Parks Air College in St. Louis a rain-making demonstration had to be called off at the last minute. The reason: it rained.

### Enough Room for Mushrooms

AN item from Stockbridge, Massachusetts, offers a ray of hope for operators of underground limestone mines in the event of another depression. Seems a chap there is doing very well cultivating mushrooms in an abandoned room-and-pillar mine. Only flaw we can see in the prospect is that if things really get tough, one of the first things most folks would dispense with would be mushrooms. Maybe it would work out better to grow some poisonous varieties, too, offering the despondent a cheap and not too messy method of ending it all.

### Weighty Problem

WE are indebted to W. J. McCoy, manager of Lehigh Portland Cement Company's research laboratory, for sending in this month's problem. You have eight ball bearings, one of which is heavier than any of the remaining seven, which are equal in weight. How can you identify the heavier bearing by making only too weighings on an equal-arm scale? Mr. McCoy points out that the solution to this one requires ingenuity rather than mathematical skill.

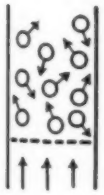
# Fluidization—Its Application to The Lime Industry

## Part III. General Concepts for the Non-Technical Reader

By WOLF G. BAUER, Consulting Engineer

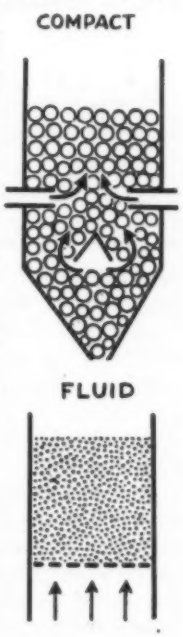
TO familiarize a wider cross-section of PIT AND QUARRY readers with the basic physical and economic factors applying to the newest methods of contacting gases with solids, it is felt that a more popularized treatment of the subject and applications of the fluidization techniques may be warranted. Earlier and more technical introductory articles* have laid down some of the fundamental patterns from which this recent engineering tool has been developed, and were intended to introduce the more technically trained section of the nonmetallics industries to the subject. In the final analysis, however, relationships expressed in the form of equations and graphs do not always represent a clear picture to the less technically minded or trained. Since the acceptance, understanding, application, economic analysis, and financial follow-through is often in the hands of those not directly interested in the purely technical truths of methods and designs, the subject of fluidization should probably be presented from several angles. Hence this brief treatment.

**What Is Fluidization?** Fluidizing a bed of solid particles is accomplished by throwing it into a state of agitation by passing a gas at a suitable velocity up through it. A fluidized bed or column of solid particles acts therefore like a boiling liquid or fluid, flowing down, or horizontally by virtue of a fluid or "hydrostatic" head, just as water flows in a pipe.



**Seeing Is Believing** Anyone can watch this fascinating phenomenon in his own home. Unscrew the dust bag from the blower exhaust collar of your vacuum cleaner. Plug up the opening (exhaust) with a dry folded wash rag. Fold a newspaper into a 7-in.-wide strip and wrap around this exhaust collar, fastening it with a rubber band. Now place the vacuum cleaner in a position such that this hole and the paper cylinder are in a vertical position. Take some dry sand, cereal grain, or breakfast food and pour into the paper collar on top of the stuffed-up exhaust hole, filling the paper cylinder about three inches deep with the material. To control the air velocity, use a piece of cardboard which can be slid over the suction lip of the cleaner in order to regulate the size of the intake opening. Start up the motor and slowly open the suction inlet with the cardboard until the material begins to expand and show a slight undulating motion. This is low energy fluidization. Additional air through the bed of solids will cause more vigorous boiling action of the material within the confines of the cylinder until the critical entraining velocity of the smallest and lightest particles is attained, after which the cylinder empties itself of the particles.

**Why Fluidize A Mass of Particles?** To distribute gas uniformly through a bed or column of sized solids requires many gas inlets around and throughout the whole cross section of the charge. Provisions for this not only impede downflow, but present difficult structural features in high temperature processing. Recognizing the advantages of heating or cooling smaller sizes of solids by direct through-flow contact, designers have come up against a limit in unit capacity due to these structural and multiple control factors arising from the greater resistance and uneven gas flow tendencies. However, just beyond these present minimum sizes of 1 to 5/16 inch (taken arbitrarily), namely, in the sand size region, fluidization immediately overcomes most of these disadvantages. When the bed is fluid, it can be given an upward or downward en-masse travel or motion, or it can be made to flow along on a level grid or grate, if no structural limitations for gas entry and distribution means present themselves. Hence there are no real limits to unit capacity except area of cross section of the channel or bed. Gas does not short-circuit or channel through the bed; particle size reduction does not increase friction loss or power needs; no mechanical means for moving the solid particles through the process unit is required; and heat transfer rates approaching those of liquids are obtained—rates that are far beyond anything that can be achieved in compact stationary or slowly moving beds, regardless of size.




**Gas-Solid Contacting Method Comparisons** There are indeed numerous examples in the various raw material extraction and processing industries which clearly chart the trend in the changing techniques of effecting heat transfer or chemical-physical reactions between solids and gases. Simply stated, the trend has been toward the increasing recognition of automatic stage-processing control of temperatures and reactions, and the more favorable conditions achieved with smaller crushed and sized solids in contact with gases.

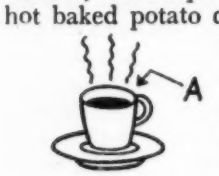
In the lime industry, for example, limestone sizes for burning have decreased from man-size pieces to nut- and pea-size. Slurries are dried by spray evaporation because of maximum heat contacting surface conditions. Liquids are heated directly by submerged combustion when permissible in order to capitalize on turbulent convection heat transfer; and more and more drying is combined with crushing, grinding, and classification for the same reasons. In other words, we are beginning to recognize the economics of high sur-

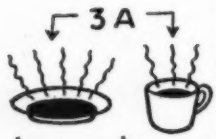
*Bauer, Wolf G., PIT & QUARRY, May, 1947, p. 90; June, 1947, p. 70.

face factor when it comes to gas-solid reactions.

**Why Small Particles?** There is of course only one pertinent answer to that — increased surface or contacting area. Surface varies inversely as the square of particle size, and although friction and power increases inversely as the square and cube of the particle size in ordinary compacted beds of broken solids, this is not the case at all in fluidized columns or beds where increased surface is not penalized by high extra power requirements.

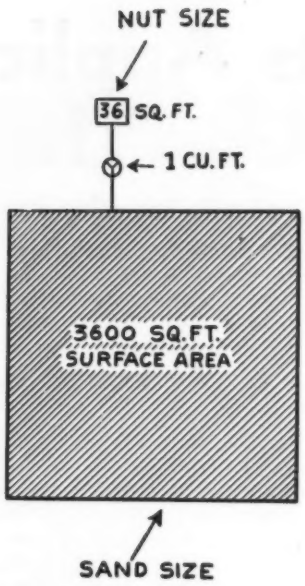
Some people cool their hot coffee by pouring part of it into the saucer. Why? Because of increased cooling surface, which speeds up cooling. A hot baked potato cools more quickly when opened and cut into small pieces than when left to cool in one piece—for the same reason.



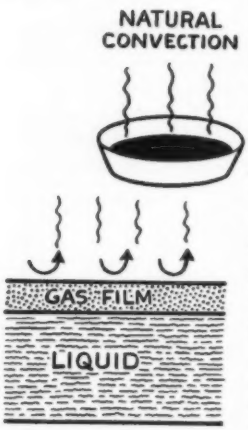




Why not show up the inefficiency of present-day heat exchangers by a quick calculation? Let's not be afraid of an equation. It simply indicates a relationship. The simplified equation $q = h\,A\,(\Delta t_a)$ for convection heat transfer simply states that q, the quantity of heat transferred, depends directly on the dead gas film adhering to each surface, A, the area of the surface exposed to the gas, and $\Delta t_a$, the average or mean temperature difference (driving force) between gas and solid. Immediately we notice, therefore, that if particle diameter is decreased, the surface area is increased as the square, and so would be the heat transfer rate, according to the equation.

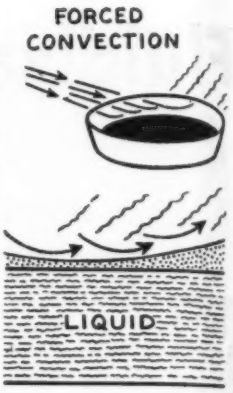
An ordinary refractory checker regenerator as used in preheating gas or air or both in mineral wool glass tanks or open hearth furnaces presents about 8 square feet of surface for gas contact per cubic foot of unit volume. A water tube boiler or tubular air preheater may offer from 10 to 25 square feet, while a direct-contact cooler or preheater as used for lime heat exchange, for example, would contain anywhere from 20 to 100 square feet per cubic foot of space, when the particles are in the range from 1½ inches to ⅝ inch in diameter. Against these figures we compare the expanded fluidized bed of 65-mesh and 150-mesh particles (which is the range using equivalent gas velocities) having 3,300 and 13,000 square feet of surface area per cubic foot of unit space. Remembering the relationship expressed by the heat transfer equation, we can proceed to be duly impressed by the working capacity of the equivalent fluidized bed volume over that of standard-type heat exchangers. Quantitative information will be given in future discussions on the subject.



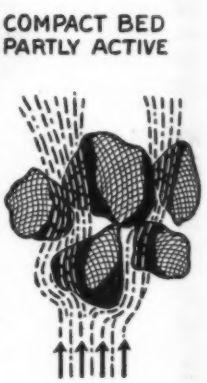

**Why Blow on Hot Soup?** To cool it more quickly, of course. We say, "Of course," but we turn right around and fire a boiler or kiln by natural draft, which after all is equivalent to waiting for the soup to cool as best it will. The real reason is that every liquid or solid surface has enveloping it a molecularly attracted stagnant layer of gas. This layer or film acts as a cushion to slow down the vibrations of the highly heated molecules of the hotter flowing gas stream, the "heat" traveling through this layer by slow diffusion or conduction. The thicker this stagnant gas layer is, the lower the heat transfer rate from gas to solid, or solid to gas.




By impinging a fast-moving gas stream against a surface, this adhering film is partly removed, or becomes slowly moving, thus increasing the speed at which heat can travel across to the solid or back. So by blowing on our hot soup, we simply thin out or remove some of these gas layers on the surface of the liquid, and bring it constant new contact with cooler air.

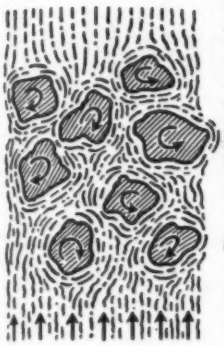



**Roasting Pigs And Stirring Pots** A gas stream flowing through a compact bed of broken solids that is either static or slowly moving, impinges on the upstream side of each particle. On that side the layer films are most vigorously scrubbed away, and heat transfer by convection is most active. The down-stream "shadow" surfaces, however, are not thus contacted because the less vigorous gas movement in the back eddies or dead pockets cannot sweep away the gas films as efficiently. It has been shown by model testing that only about one-third of the total particle area is directly exposed to full gas impingement and scrubbing. Convection currents over all the particle surfaces are further reduced by the tendency of the gases to channel through the least constricted void spaces, so causing non-uniform heat transfer.



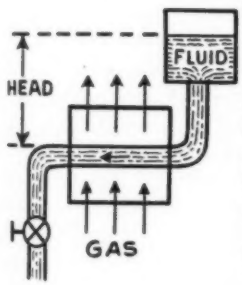

It is well known that continuous turning and revolving is necessary in barbecueing a pig over a fire to heat the meat evenly from all sides. Likewise, if we do not stir a pot containing cereal, the bottom portion burns, and the top remains uncooked. The particles and the gas streams in a fluid system are released of their confining constrictions; there is ample room for gas to rise evenly through the material. What is even more desirable, each particle is now constantly stirred around by the gas currents and the buffeting received from its neighbors. Furthermore, axial gyration

**FLUID BED FULLY ACTIVE**



and spinning is imparted each particle by the shocks and collisions, which cause it to traverse the gas paths like curving baseballs and give it a thorough scrubbing from all sides. This activity increases by a large margin the relative gas contacting surface per total available surface over that available in compact beds of solids.

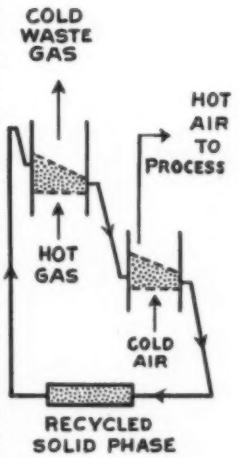
**Are Liquids Easier To Handle Than Solids?** In most cases the answer is an emphatic "yes." The fluidization technique has, with one stroke, freed the designer from many problems dealing with the provisions for uniform-flow-promoting agents of both gas and solids while undergoing processing. By fluidizing the material the solids are fed, transported, and controlled, just as any liquid would be. For high temperature processing, the advantages become immediately obvious, the most striking one being the complete absence of moving parts or heat and gas distribution elements that must be made of expensive alloys, refractories limited in length or size, or complicated mechanisms for controlling flow and conditions of process.




**High Temperature Processing** Fluidized columns or beds of solids at high temperatures can readily be maintained within close limits of temperature because of the astounding speed of heating through the mass. In fact, when combustion is allowed to take place within the fluid zone, no visual flames are formed as such, because turbulency and heat abstraction rate from the point of heat generation does not provide time for hydrocarbon cracking and incandescent soot formation. Furthermore, practically no excess air is required for combustion itself, as the mixing of unburned gas and air is extremely thorough and complete, even at very short gas-bed contact periods.

**Low Temperature Processing** Since convection plays the predominating role here, fluidization probably is the most efficient heat exchange system known today between gases and solids. Control of heating or cooling gas flow and temperature, as well as regulation of solid through-out is so simplified because of the fluid characteristics of the system, that process temperatures can be maintained within a few degrees at all times. In processes where solids must be held close to a critical heat range or exposure time limit during drying, calcining, roasting, reducing, gas conditioning, coal volatilization, etc., this control is of vital significance.

**Waste Heat And Hot Air** The question of whether waste heat recovery is practical or of economic interest is one of heat quantities, heat intensities, and relative cost of bought fuel heat units in relation to processing costs. The relationship of B.t.u.s and degrees of temperature is a controlling factor, for it is obvious that the recovered heat must be of usable quantity and quality. No matter how efficient a heat transfer system may be, if it costs as much or even more in power, repair, and depreciation than the value of usable heat units recovered, it is generally not warranted except in instances where certain process advantages outweigh the additional cost. Such process advantages, for example, may be obtainment of very high flame temperatures through high combustion air preheating, or clean hot air for sensitive drying or processing conditions. Because of continuous operation, the ready adaptability of high specific-heat solid medium in the form of fluidized grain, and the possibility of complete ceramic refractory construction-material design, the fluid bed recuperator for recovering waste heat, preheating combustion air, or furnishing heated air to new temperature levels of above 1500 deg. F. for direct processing use, is well adapted to replace many present-day inefficient types of heat exchangers.




**Summary** What has been pointed out, so far, with respect to fluidized solids in comparison with other and older gas-solid reaction techniques, may be summed up briefly as follows:

1. Fluidized solids react more quickly because of their greater surface area, allowing reduction in the time factor for certain sensitive processes such as calcination of alumina clays or soft-burning of reactive dolomite and magnesite.
2. The greater reactive surface area achieved in fluid beds is due not only to the smaller particle diameters, but also to the constant spinning and unrestricted movement of gas and solid phase in turbulent counterflow and cross-flow.
3. Heat transfer, due to thorough scrubbing of gas films by turbulent gas flow and repeated collision and rubbing contacts is very high, approaching that obtained with true liquids.
4. In evaluating columns and beds of fluidized solids at gas velocities commonly employed in other heat transfer apparatus, it becomes apparent that much smaller units will produce considerably higher heat conversion work.
5. The fluid nature of the dynamic gas-solid system allows simple refractory construction for all ranges of temperature conditions, without recourse to mechanical means for moving the solid phase through the device.
6. The rapid heat transfer and gas mixing makes possible submerged integral combustion without excess air, and also temperature regulation within very narrow limits.
7. Although decrease in particle size or wide range of sizes has a frictional resistance effect and higher power demand for gas movement in compact beds and columns, such is not the case with fluidized masses.
8. The somewhat higher power requirements for solid particle preparation and gas movement in fluidization systems are easily offset by the many cost-saving features listed above.

Part IV of this series on fluidization will appear in an early issue and will bring under discussion the fluid-bed, open-channel waste-heat recuperator, and the fluid-bed air heater for high temperatures, both as to design, operating data, comparisons with other types, and field applications of interest to the nonmetallics industries.

# Expansion Program at Huron Portland Promises 6,200,000 Bbls. Annually

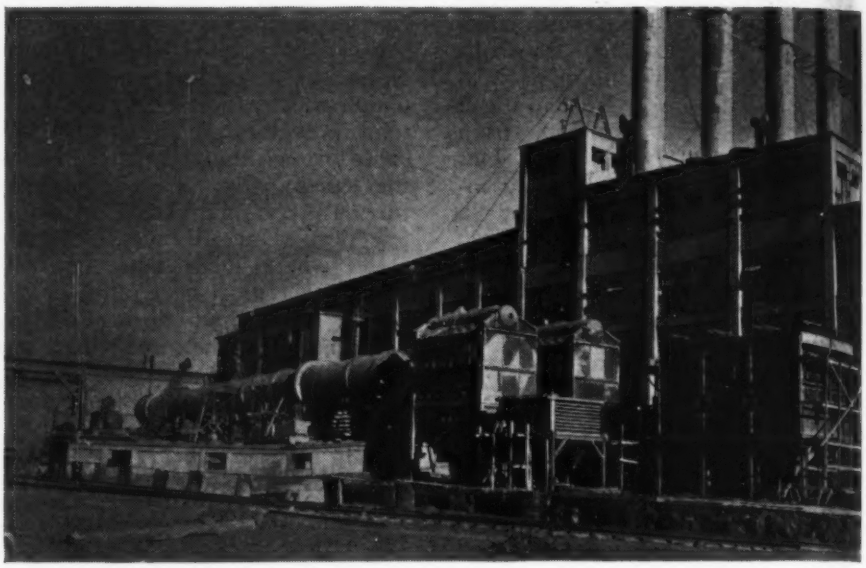
another ON THE SPOT report

UPON completion early next year of a comprehensive expansion program now in an advanced stage, the productive capacity of Huron Portland Cement Company's plant at Alpena, Michigan, is expected to

**By WILLIAM M. AVERY**

show almost a 50 percent increase. This set-up will give the company a clear claim to operating the world's largest cement mill. When the anticipated productive capacity of 6,200,000 bbls. annually is achieved, at the conclusion of the current expansion program, the Alpena mill cannot fail to be at the top of the list by a comfortable margin.

The original mill at Alpena, which was built in 1907, had eight 8- by 110-ft. kilns. Shortly after World War I six larger kilns, measuring 10 by 153 ft. were added to the plant, increasing the capacity about 150 percent. The four new 10- by 153.5-ft. kilns now being installed constitute a continuation of the present No. 2 kiln room. As in the past, however, all preliminary and finishing operations will be performed together, the only division in the flow occurring in the kiln departments. The four new rotary kilns will be housed in a steel frame building measuring 102 by 302 ft., with an average height of 47 ft.

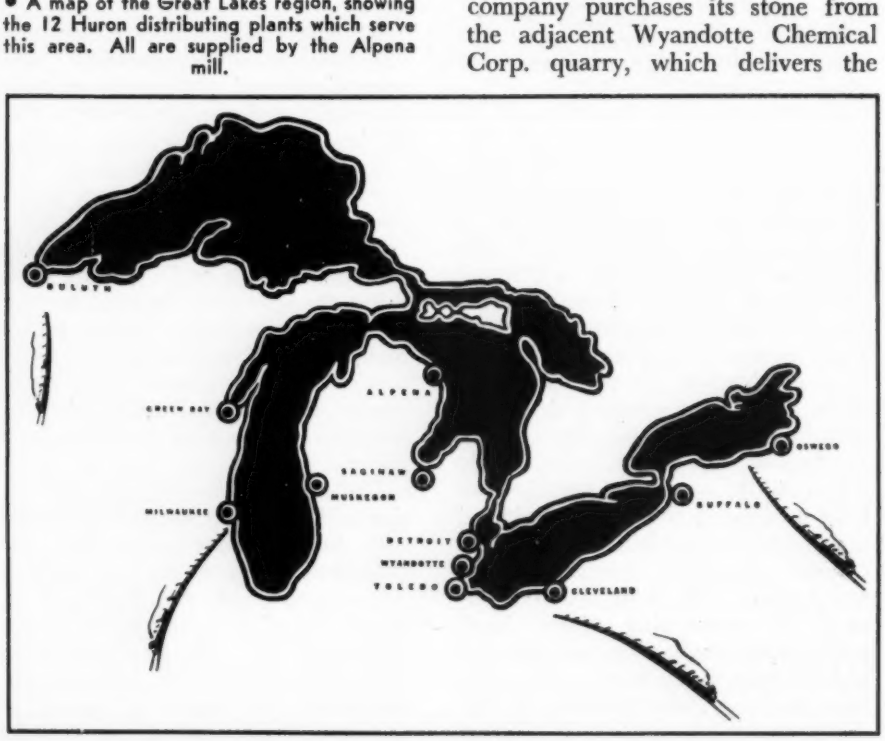


• This construction view of the Huron Portland Cement Company's plant at Alpena, Mich., shows two of the four new kilns already on their piers. Waste heat boilers and electrical precipitators for the two kilns are also in position.

This sizeable expansion program is being carried out with surprisingly few major changes in the various departments of the mill. Additional shale will be provided by longer operating hours at Huron's shale quarry located at Paxton, Michigan, some 10 miles from Alpena. The company purchases its stone from the adjacent Wyandotte Chemical Corp. quarry, which delivers the material on an overhead belt conveyor system into Huron's own bins, and here again additional operating hours will easily take care of the increased demand. Similarly, extra operating hours on the four stone dryers and two shale dryers, which are currently running two shifts on a 5-day week, will preclude the necessity of installing additional equipment in this section of the mill. When all the new facilities are in operation, preliminary finished grinding ahead of the finished grinding mills will be done on eight new Bradley-Hercules mills, four of which are already in service. During the interim stage, until the new kilns are in production, half of the battery of 12 tube mills will be tied in with the Bradley-Hercules units; of the remaining six tube mills, four will operate on preliminary finished grinding and two on finished grinding.

Two of the new kilns were furnished by Allis-Chalmers, and are already on their trunnions (see cut). The other two, supplied by Vulcan Iron Works, are in the process of being erected. The all-welded shells have two riding rings and rolls and are set on a pitch of ⅜ of an inch per foot. Four-speed, 50-hp. motors drive the units through Texrope V-belts and speed reducers. From a top speed of 72 r.p.h. reductions to ¾, ½ and ⅜ are obtainable. For 35 ft. the new kilns are to be lined

• A map of the Great Lakes region, showing the 12 Huron distributing plants which serve this area. All are supplied by the Alpena mill.



• One of the four new mills which have been installed to step up finished grinding capacity in anticipation of vastly increased clinker output.

with 6-in. high-alumina (70 percent) brick; the remainder of the length will be lined with 9-in. intermediate kiln brick. Detrick suspended—arch kiln housings are being installed. The mixed feed to the kilns will be synchronized with the kiln drive motors. Forced-air-cooled discharge ends have been incorporated in the design.

Coal for each new kiln will be pulverized in a Raymond No. 452 direct-fired bowl mill, using automatically-regulated hot air off the kiln hood to dry the fuel. The mills, each of which will have a capacity of 4 t.p.h., will have Hagan automatic mill feed controls operating from the current input to the mill motors. The new kilns are each expected to produce 1,300 bbls. of cement per day.

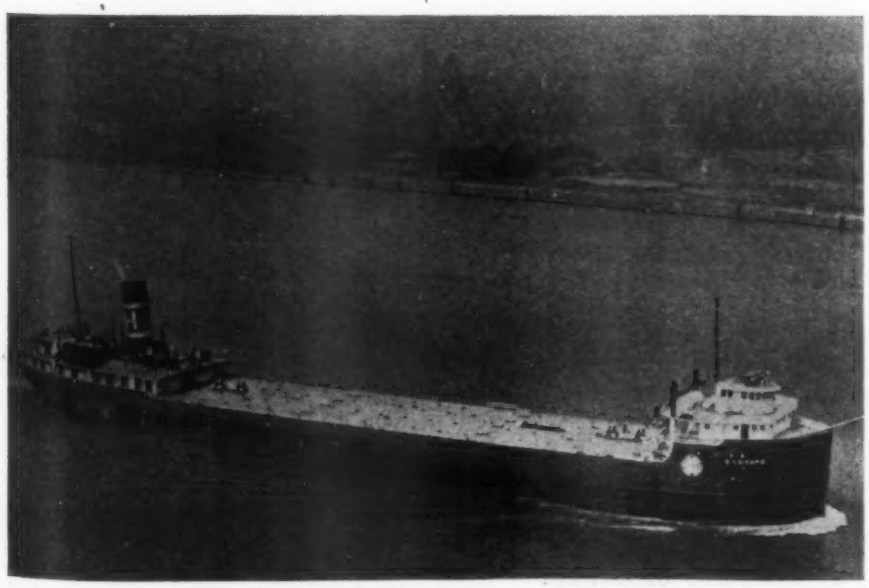
The 20- by 6-ft. Fuller grate coolers being installed for the new kilns are expected to discharge clinker at temperatures not exceeding 120 deg. F. Similar coolers will also be installed on the existing 10- by 153-ft. kilns. Fuller coolers were installed on the small kilns several years ago. When the No. 2 kiln department expansion is completed, the new coolers will discharge into drag conveyors which will in turn discharge into a separate clinker pit. Graded resistance, plate-type electrical precipitators, designed and built by Huron, are being installed for the new kilns. These will have a collecting efficiency of about 95 percent.

All fourteen of the existing kilns in the Huron mill have waste heat boilers. In the new burning department Wickes 1,000-hp., bent-tube boilers of a relatively new design are being installed. They will generate steam at 200 lbs. pressure, and are expected to yield from 24,000 to 30,000 lbs. of steam per hour each. This is a somewhat higher output than is obtained from the present boilers. Feed water for the new boilers will be heated with Green fuel economizers. In addition to generating all the power for its own operations, Huron sells power to Wyandotte Chemical Corp. At present one 10,000-kw. turbine and three 5,000-kw.—all Allis-Chalmers—are operated.

In the raw grind department one 7- by 26-ft. two-compartment compeb mill is being installed in connection with the present expansion program, making nine such mills in all. Liners in this new mill will be the Allis-Chalmers Lorain type, consisting of separate high-carbon rolled-steel lifters and liner plates. It will have a plain division head with screen plates separating the preliminary and secondary compartments. A Hardinge Feedometer and a Jeffrey tubular vibrating feeder will be used to feed the mill. It will operate in closed circuit with a 14-ft. Raymond air separator. The new compeb mill will have a capacity of 24 to 25 t.p.h., and it will be driven through a 72-in. Cutler Hammer magnetic clutch by a 500-hp. G. E. synchronous motor.

• Right: This view shows one kiln in place and the second being assembled on cribbing before rolling it into position.

• Below: The "S. T. Crapo," which with its sister ships, the "John W. Boardman" and the "Samuel Mitchell," has a combined cargo capacity of 20,000 tons. From April to November these sturdy vessels shuttle the routes between Alpena and the distributing plants at the 12 Great Lakes ports.

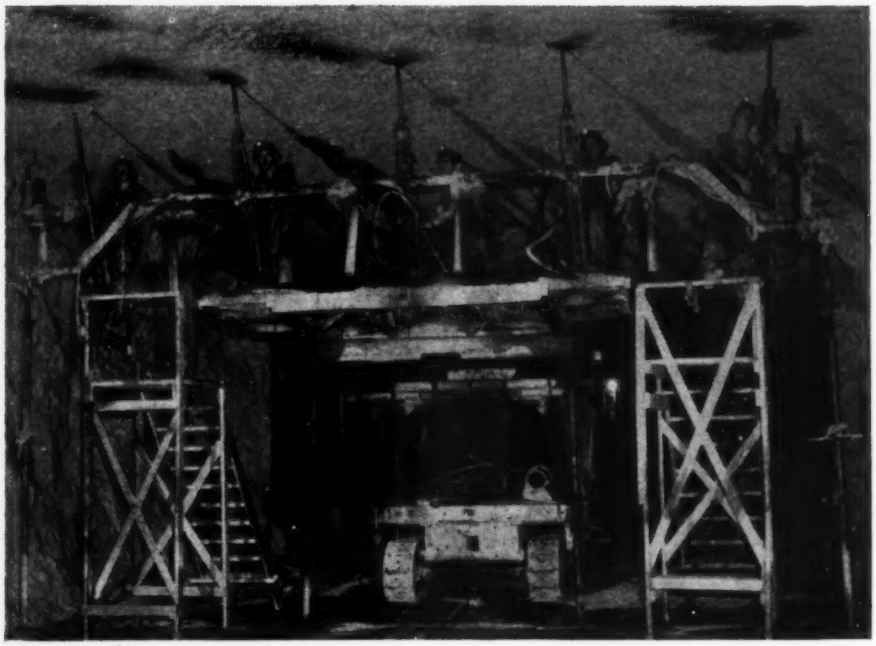


The new Bradley-Hercules mills, mentioned earlier, will complete the new production facilities at Alpena. These machines have separately driven horizontal disc-type feed tables, with the drives under automatic control so arranged that the load on the main mill motors is maintained between predetermined high and low limits. The main mill drives are 350-hp., 4,000-v. squirrel-cage motors. Formerly the finished grinding circuit consisted of eight 7- by 24-in. two-compartment preliminary mills in closed circuit with air separators (largely Sturtevant),

(*Continued on page* 113)

# World's Deepest Limestone Mine Does Crushing Underground

By W. E. TRAUFFER



another ON THE SPOT report

FROM an engineering and operating standpoint, one of the most interesting nonmetallic minerals operations in this country is the limestone mine of the Columbia Chemical Division, Pittsburgh Plate Glass Co., at Barberton, near Akron, Ohio. This is the deepest mine in the state, the deepest in the limestone industry, and one of the deepest in the country. The floor level of this mine is 2252 ft. below the surface of the ground and it is being worked by the room-and-pillar system. There are two shafts 550 ft. apart—No. 1 for hoisting stone only and No. 2 for handling men and supplies. Primary crushing is done underground and the final reduction and screening plant on the surface has a capacity of over 300 t.p.h. Features are the use of diesel trucks and 1½-cu.-yd. electric shovels in the mine and the underground primary crushing and scalping plant.

This mine was developed primarily to provide a local source of limestone for the company's chemical plant two miles away, where it is used in the manufacture of soda ash, caustic soda, and numerous other alkali products. Fuel and other raw materials were available at the plant but limestone had to be brought in from distant quarries by lake carrier and rail at very high cost. In drilling the 2750-ft. salt wells for the chemical plant the limestone had been penetrated at different points, and analyses had indicated the extent and quality of this deep bed of limestone. Further diamond drilling was also done to corroborate the earlier evidence that certain sections of the deposit were suitable for kiln stone for the chemical plant. As a result of this exploration it was decided to develop a mine and build a plant.

• Overhead drilling being done from a Jumbo drill platform mounted on a crawler tractor chassis.

As the plant was intended primarily to produce 1-in. plus stone for the vertical lime kilns at the chemical plant it had to be designed to get rid of the smaller material as commercial stone. This made an elaborate screening plant a necessity.

## MINE DEVELOPMENT AND OPERATION

**Shaft Sinking** The E. J. Longyear Co., which did the exploration work, was commissioned to sink the two shafts. This work was begun in February, 1941, and the No. 1 shaft reached the top of the stone deposit on May 24, 1942, at a depth of 2197 ft. The No. 2 shaft was sunk to a depth of 2258 ft. and the No. 1 shaft to 2323 ft.—71 ft. below the mine level, in order to accommodate the loading pocket, the skip bucket, etc.

As most of the distance from the surface to the limestone is through shale, both shafts were framed with steel and concreted through this distance except for 100 ft. at the collar of No. 1 shaft, which is in solid concrete. Both shafts are 7 by 17 ft. in section. The No. 1. shaft has three compartments, two for hoisting and balance and one for general service. The No. 2 shaft has two compartments, one for the cage and the other for counterbalance, power cables and general service.

**Geology** Below the shales lie 5 ft. of Delaware limestone and 215 ft. of Columbus limestone of the Devonian Age. Only the top 46 ft. of the Columbus limestone was considered of sufficient purity for chemical use. This established the mine floor level at 2252 ft. below the surface. It is a gray limestone with an average of 92 percent $CaCO_3$. Thin shale and stylo-litic partings divide the stone into distinct seams from 7 in. to 6 ft. thick. Below the limestone is a 200-ft. bed of gypsum.

• A general view of the entire surface plant with the mine shaft head-frame at right, the "A" storage tower at left, and the main processing building and truck-loading bins in center.

**Mine Layout** The double-entry system of room-and-pillar mining is used with rooms 32 ft. wide, 17 ft. high, and 600 ft. long turned on 75-ft. centers. As the rock stratum dips to the southeast about 18 ft. per mile, and the main drift through the two shafts is east and west, the mine was developed at a 90-deg. angle to the drift. The double entries are driven 18 to 30 ft. wide and 17 ft. high and the rooms are 32 ft. wide and 28 to 46 ft. high. The floor parting is well defined and so are the roof partings at the 17-, 28-, and 46-ft. heights. This makes a good truck roadbed and a safe clean roof.

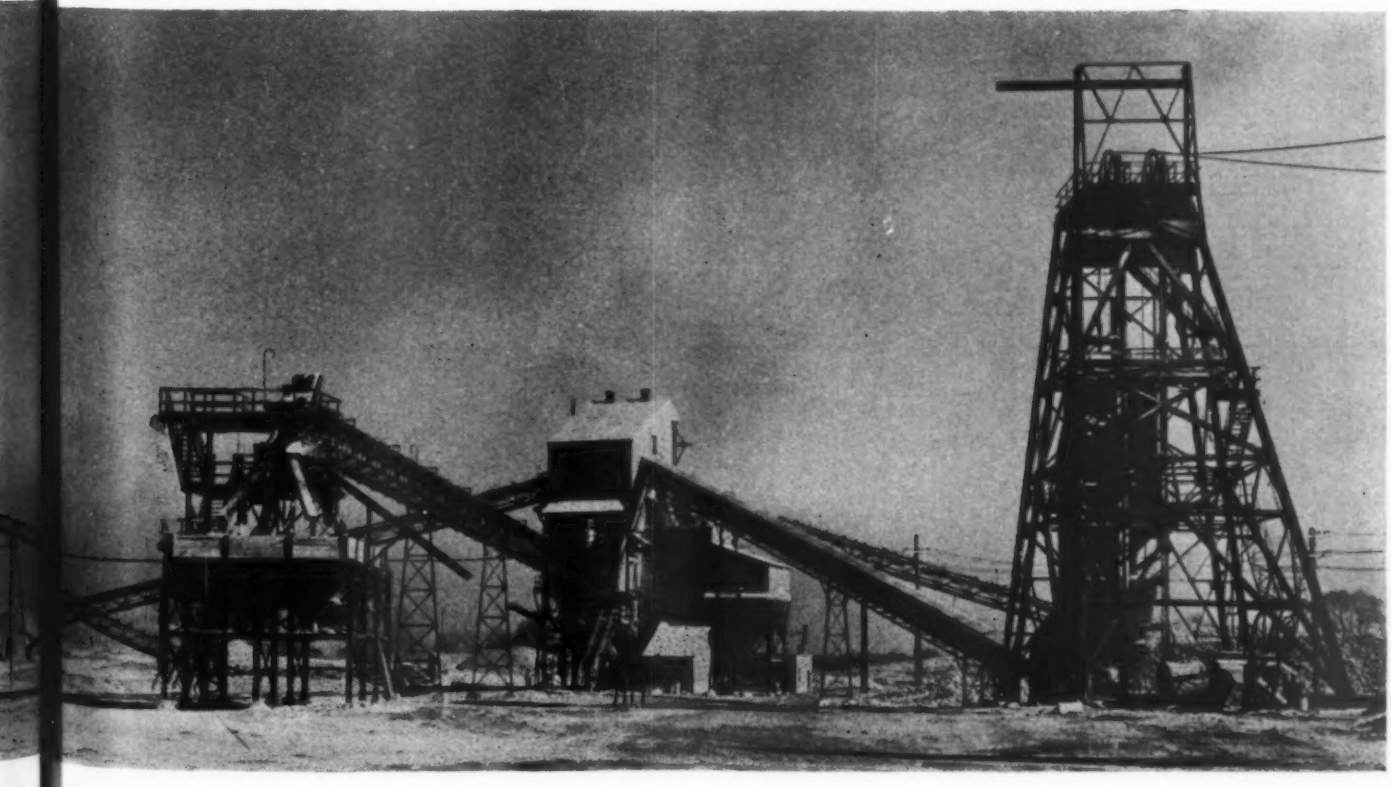
**Drilling and Blasting** Double entries are driven 24 ft. wide and 17 ft. high by advancing a 9- by 24-ft. heading and then taking the 8- by 24-ft. bench with down holes. In the headings a V-cut round is drilled with drifters on column-and-arm mountings. Two crawler-mounted scraper units are used for loading from the muck pile in these entries. A 3-drum electric slusher hoist operates the 5-cu.-ft. scraper which discharges the stone from a ramp into trucks.

The 63-hole "burned-cut" round being used to drive the 17-ft.-high by 32-ft.-wide rooms and single entries was developed to produce maximum breakage, and to take full advantage of the partings without drilling in the hard, cherty layers. It is claimed that this system, a variation of the "Cornish" or "Michigan", system also gives greater advance per round and keeps the broken stone closer to the face, yet is said to equal the yield of other methods.

• One of the two 1½-cu.-yd. electric shovels loading one of the eight 8-ton diesel haulage units in the mine.

In order to help the drillers to spot the holes correctly for this round, lantern slides of the pattern are prepared from drawings. (See p. 96.) This pattern is projected on the face with a standard slide projector operated by four 6-volt storage batteries and a mark is painted on the face for each hole, quickly and accurately marking off the entire round for drilling. This system standardizes the drilling and the amount of explosive and results in maximum efficiency.

Of the five center holes shown the center and end ones are left blank. The fourteen sets of holes



marked 0, 1, 2, etc. are shot in sequence, using standard electric delay caps and 40 percent gelatin explosive. The two instantaneous holes 0 blow in the stone between them and the three blank holes, forming a slot. The No. 1 holes blow in on the slot and the other holes follow in sequence, blowing the stone toward the center and slightly outward from the face.

At present the 21 closely-spaced cut holes are drilled by wagon drills and the others from "Jumbo" drilling rigs. One of these rigs is mounted on crawlers and has a platform hinged to a cantilever boom so it can be raised from the floor level to a height permitting drilling of the 17-ft. roof. Four drifters are mounted horizontally on Cleveland booms for wall drilling. When drilling the roof a bar is fastened horizontally to these booms and five drifters are mounted on it. The second rig is mounted on a truck chassis and has two booms on its upper and two on its lower deck. Both units are powered by 440-v. electric motors. The third rig is crawler-mounted and has four drills mounted horizontally on Cleveland booms.

In this manner the rooms are completed 32 ft. wide, 17 ft. high and 600 ft. long. The blasters charge the faces on the second shift only and shots are made after the mine has been cleared of everyone but the blasting crew. A diesel-powered utility truck with a double-deck platform is used for hauling supplies on the first shift and by the blasters on the second shift for charging these high faces.

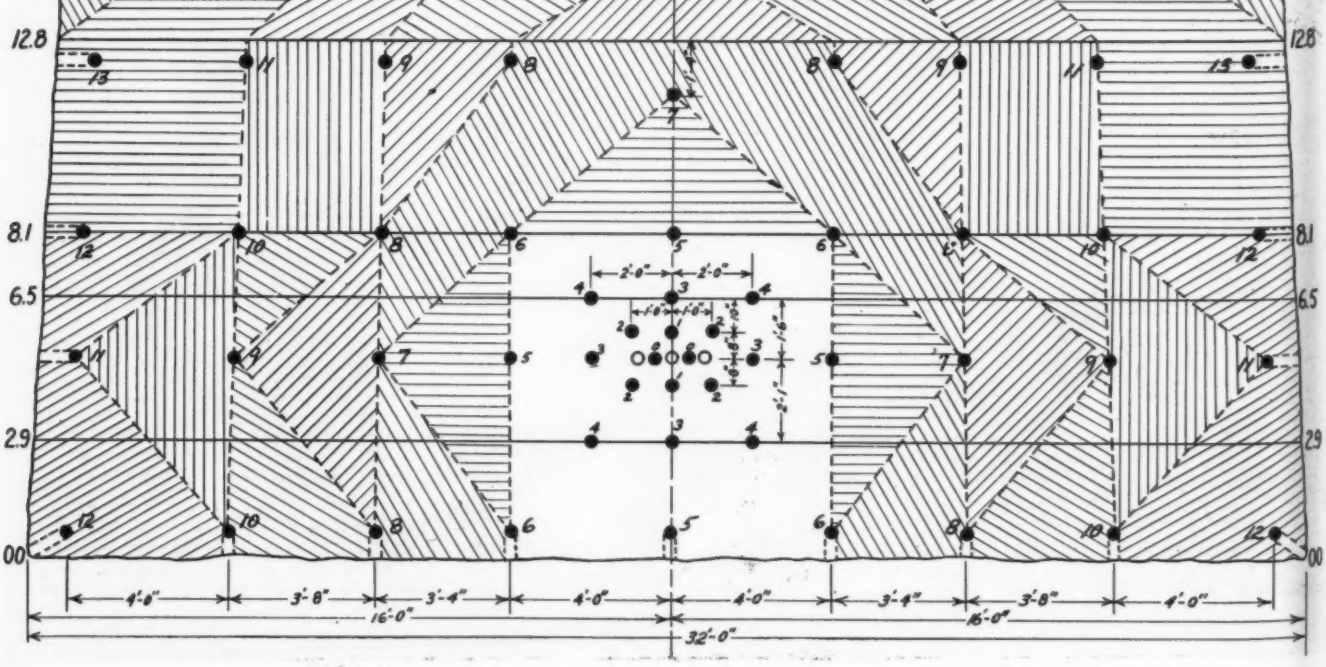
After a room is cleared out an additional 11 ft. of stone is stoped from the roof by drilling holes from another Jumbo. This carries five drifters equally spaced on a bar so that the entire width of the room can be drilled at once. This rig is crawler-mounted and can be readily reconverted to a 4-machine unit for drilling room faces. These holes are drilled at an angle of 70 deg. from the horizontal away from the rig so that the mud will drop away from the rig and the operator. After each row of five holes is completed the rig moves back 4 ft. for the next row. The 600-ft.-long rooms are completely drilled before shooting is started in order that the drilling will not be interrupted by loading, shooting, etc. Seven rows of holes are shot at once, also with standard electric delay caps and 40 percent gelatin. The center hole in the first row is instantaneous and is followed in sequence by the two adjoining holes, then the two end holes and the center hole of the second row, etc. All shots are detonated by locking switches.

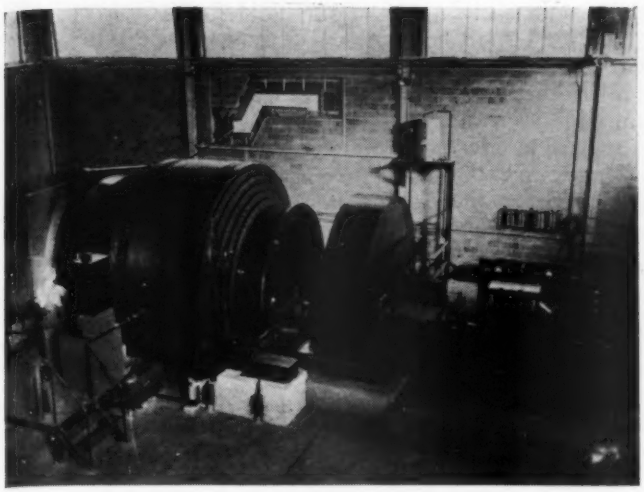
One room is now being drilled in this same manner to a height of 46 ft. above the mine floor in one operation. A double-length feed used to reduce drill charging time is obtained by mounting an entire automatic-feed drifter on the automatic feed of another machine, giving double the usual run. Only in these stoping operations must the holes be drilled through the hard cherty layers which make bit gauge wear a problem.

All drilling is done wet with 1¼-in. hollow round drill steel and Ingersoll - Rand detachable bits. Both are sent to the mine blacksmith shop for hot-milling, forging and heat treating. The mine repair shop employs carpenters, mechanics, boilermakers and pipe fitters and has the necessary equipment for making almost all major and minor repairs except large machining jobs.

**Scaling** Other utility equipment underground includes a small electric shovel base rigged with a boom and cage from which scalers can reach all corners of the face to pry down loose rock ahead of the drillers. The telescoping boom can be extended to reach even the 46-ft.-high stope roofs now being developed.

• Diagram of one of the "burned-out" rounds used to drive the rooms and entries.





• Left: Material is hoisted from the mine by this 1250-hp. bi-cylindrical-drum hoist at the rate of 300 t.p.h.

• Right: The 1500-hp. motor-generator set which provides direct current for the mine hoist motor.

A Cletrac diesel tractor, equipped with a bulldozer and an overhead loader, maintains the roadways and cleans up at the face after blasting. The bulldozer blade can be removed when desired and a cage attached to scale down rock from the 17-ft.-high face.

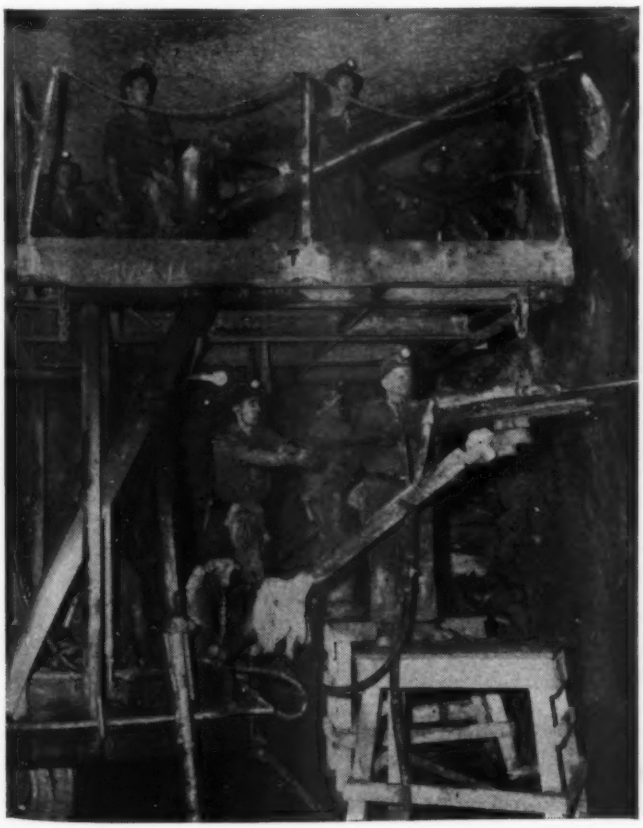
**Loading and Haulage** Loading is done, in both rooms and stopes, by two 1½-cu.-yd. Marion full-revolving electric shovels with 2300 volt a.-c. motors. A Joy 4-cu.-yd. loader was recently installed and some loading is also done by the scrapers already mentioned. All the stone is hauled by eight Koehring 8-ton Dumptors, each powered by a 107-hp. General Motors diesel engine. These discharge the stone at mine level into a 60-ton pocket. Ideal traffic conditions are made possible by a regular traffic light at the main intersection and an electric eye stoplight which keeps any truck from entering the crusher chamber until the preceding one has left it.

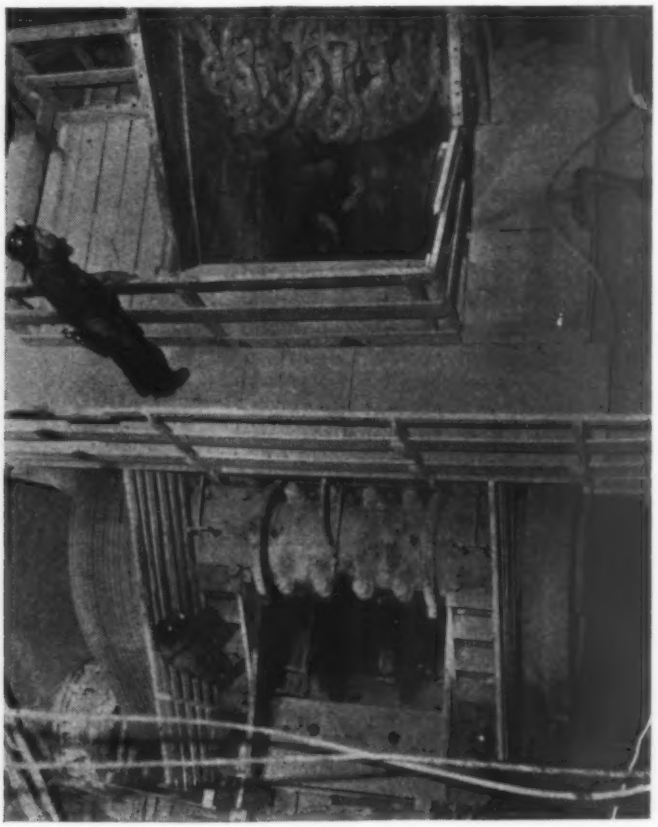
• Left: Mobile drilling rig mounted on crawler tractor which is moved up to the limestone face.

• Right: Looking down at the chain feeder and the 48- by 60-in. jaw primary crusher underground.

**Crushing and Scalping** A Ross chain feeder controls the flow of the stone from this pocket over a 5¾-in. rail grizzly into the 48- by 60- in. Allis-Chalmers jaw primary crusher. This has specially-designed corrugated slab-breaker jaw plates and oil pressure lubrication throughout. It is driven by a 300-hp. motor through V-belts.

The minus 6¾-in. product of the crusher and the grizzly throughs are carried on a 42-in. by 212-ft. inclined belt conveyor (No. 8) followed by a 42-in. by 132-ft. conveyor (No. 9) running in the opposite direction. This discharges the stone onto a 5- by 12-ft. Allis-Chalmers 1- deck scalping screen (No. 1) with 6½-in. round perfo-





rated plate. The oversize material, much of which is slabby, is discharged onto a 42-in. by 71-ft. 5-in. horizontal conveyor (No. 10) which returns it to the primary crusher.

The minus 6-in. stone passing through the screen drops into the 500-ton storage pocket which loads the skip. This pocket, the crusher feed bin, the crusher room, the galleries, etc. are all cut out of the solid rock. An 83-ft. man-lift elevator connects the crushing floor, main level and screen level.

**Skip Loading** The skip-loading pocket has a guillotine-type sliding gate operated by an air cylinder. The stone is discharged into a volume-measuring pocket with an air-cylinder-operated arc gate. This gate cannot be opened until the main pocket gate is closed, and 10 tons of stone then slide through a chute into the skip bucket. This is all done by manual control.

**Hoisting** This production shaft (No. 1) is, as has been stated, 2323 ft. deep. Balanced hoisting is used, with two 250-cu.-ft. (10-ton) capacity Lake Shore Eng. Co. skips being operated by an Allis-Chalmers hoist with a single 10- and 16-ft.-dia. bi-cylindrical conical drum, and using 1¾-in. improved plow steel cable. This hoist delivers slow speed and high torque for starting the load and high speed for the long pull. The trip to the surface is made in 117 seconds, of which 77 seconds is at high speed and the balance is acceleration and deceleration. Between them the skips haul 30 loads or 300 t.p.h. The hoist is driven by a 1250-hp. Allis-Chalmers, d.-c. motor connected to a 1500-hp. motor-generator set which gets 2300-v. a.-c. power. The hoist may be operated manually but all regular stone hoisting is automatic, requiring only the skip loader's pull switch to start it. The entire stone-handling operation requires only one man in the crusher department and one at the skip-loading point.

**Mine Ventilation** Shaft No. 2, used for service and personnel hoisting, is also used for mine ventilation. An American Blower Co. No. 12½ fan, driven by a 50-hp. motor, supplies 80,000 c. f. m. of air at 2½-in. water pressure into the mine. This air circulates through the workings and comes out through the No. 1 shaft. Its volume is sufficient to reduce the concentration of fumes from the 11 diesel units to an insignificant amount with only a noticeable odor. Checks made occasionally by the U. S. Bureau of Mines verify the tests made by the company.

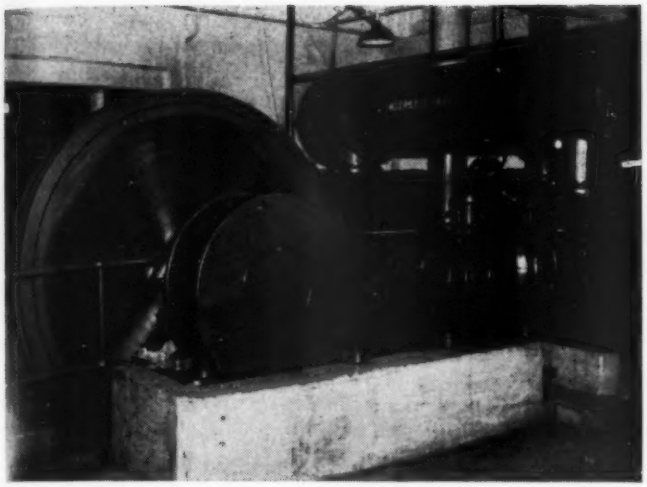
## SURFACE OPERATIONS

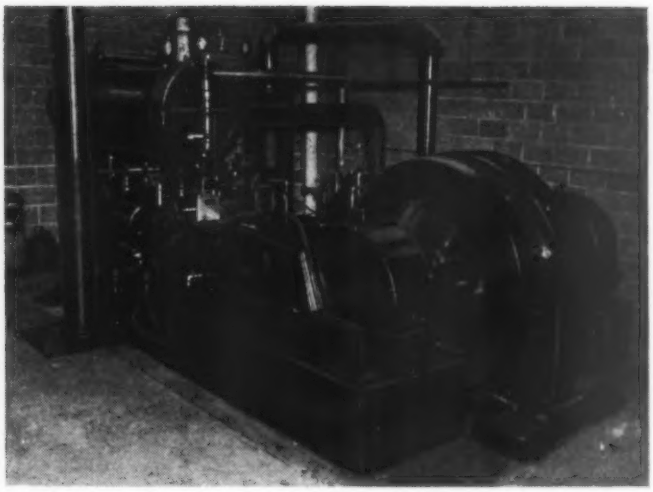
**Chemical Stone** At the surface the stone is dumped from the skips into a 100-ton steel storage pocket mounted in the head frame. A Jeffrey-Traylor vibrating feeder serves the 30-in. by

• One of the 8-cu.-yd. haulage units used above ground for stockpiling and general utility.

• Tractor-mounted rig from which scalers can reach all corners of face to pry down loose rock ahead of drillers.

• Miners in their underground lunchroom. Some of these men are from the Michigan copper mines.





• Left: The 1800-c.f.m. compressor above ground which, with two 850-c.f.m. units, one of which is shown at right, supply all compressed air needs above and below ground.

218-ft. belt conveyor (No. 1) which carries the stone up to the mine-run screen (No. 2) in the main or trolley-loading building. This is a 5- by 12-ft. Allis-Chalmers 2-deck Ripl-Flo screen which makes two sizes of kiln stone between the 1-in. and 6¾-in. openings. These sizes of stone drop into the two compartments of a 500-ton steel bin from which cars are loaded for the chemical plant. There are nine arc-type drop-chute gates operated by push-button-controlled Master gearmotors. The controls are located in a control room from which practically all surface operations are visible. Pittsburgh Plate Glass Co. Herculite safety glass plates in the floor permit the operator to see the cars being loaded. This glass will not scratch or break. Each train consists of a 26-ton-capacity Differential Steel electric trolley locomotive hauling a 30-ton car. Loads are then weighed on a Fairbanks track scale with an automatic recorder before making the 2-mi. trip to the chemical plant.

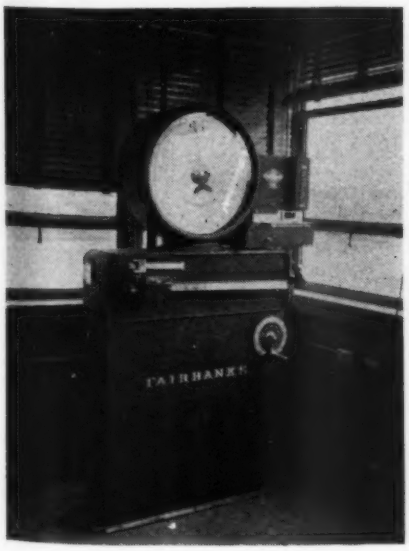
Two side chutes in this bin make it possible to haul the plus 1-in. stone from these bins to stockpile storage in two 8-ton Koehring Dumptors identical with those used in the mine. This storage is used as a surge in case of interruption to the trolley service and for stone in excess of chemical plant needs. It is stored in the "B" Kern radial-tower storage system and in adjoining stockpiles.

The kiln stone is reclaimed from the "live" section of B tower onto a 30-in. by 252-ft. belt conveyor (No. 3) which carries it back up to the top of the main trolley loading building. There the stone can be discharged by means of a Kern revolving spout back into the trolley-loading bins or onto a 5- by 14-ft. Ripl-Flo 2-deck screen (No. 11). This is used for cleaning kiln stone before shipping it out for commercial use. The stone from the screen can either be discharged through chutes direct into railroad cars or onto a 30-in. by 250-ft. horizontal belt conveyor (No. 7) to truck-loading bins. This bin has six compartments holding 20 tons each.

The railroad cars are spotted for loading by an electric car puller. They are weighed on a 150-ton Fairbanks-Morse track scale with its beam and automatic recorder in the control room, already mentioned, which is 60 ft. above the tracks.

**Agstone** The minus 1-in. stone passing through the mine-run screen (No. 2) drops through a split chute to a pair of 4- by 10-ft. Ripl-Flo single-deck screens (Nos. 6 and 7) with .087-in. slotted wire cloth. The material passing through these screens (100 percent minus ⅛-in.) is carried on a 30-in. by 22-ft. belt conveyor (No. 6) to the 60-ton steel agstone truck-loading bin.

The ⅛- to 1-in. stone passing over the No. 6 and 7 screens, can, when there is sufficient demand for agstone, be diverted entirely or in



• Left: The 30,000-lb. truck scale in the plant office.

• Above: The reversible hammer-mill used to produce agstone.

• Right: The master control board for all processing operations.

any desired volume from the main plant stream by means of an adjustable split chute to another split feeding an Allis-Chalmers Pulverator and a Pennsylvania reversible hammer-mill. A bucket elevator feeds the product of these machines to a pair of Ripl-Flo 1-deck screens (Nos. 8 and 9). The material through these screens is also agstone and also goes via conveyor No. 6 to the truck-loading bins.

**Commercial Stone** The ⅛- to 1-in. stone passing over the Nos. 8 and 9 screens and the main flow from the Nos. 6 and 7 screens is carried on a 24-in. by 293-ft. inclined belt conveyor (No. 4) to the top of the "A" Kern radial-tower storage building which is used solely for commercial stone sizing and storage. There the stone drops through a split chute onto a 4- by 10-ft. Ripl-Flo 2-deck screen (No. 4). This makes a ⅜-in. finished product which is chuted to storage.

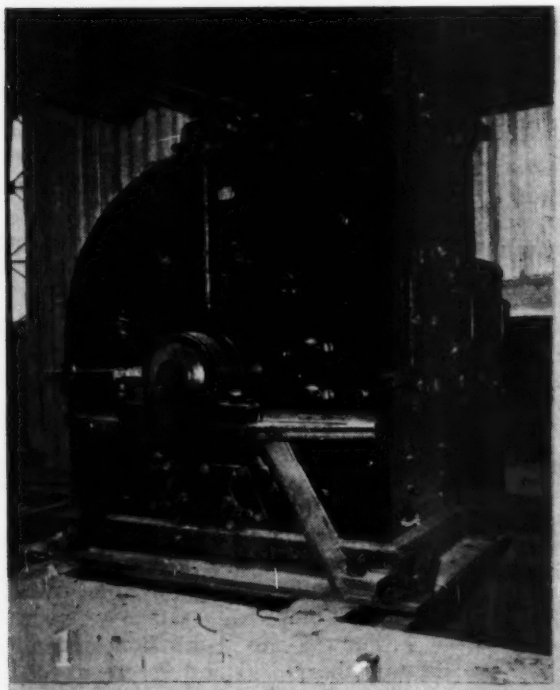
The ⅜- to 1-in. oversize from screen No. 4 goes to a 3- by 8-ft. Tyler Niagara 1-deck screen (No. 10) with ¾-in. wire cloth from which 1- and ¾-in. products are chuted to storage.

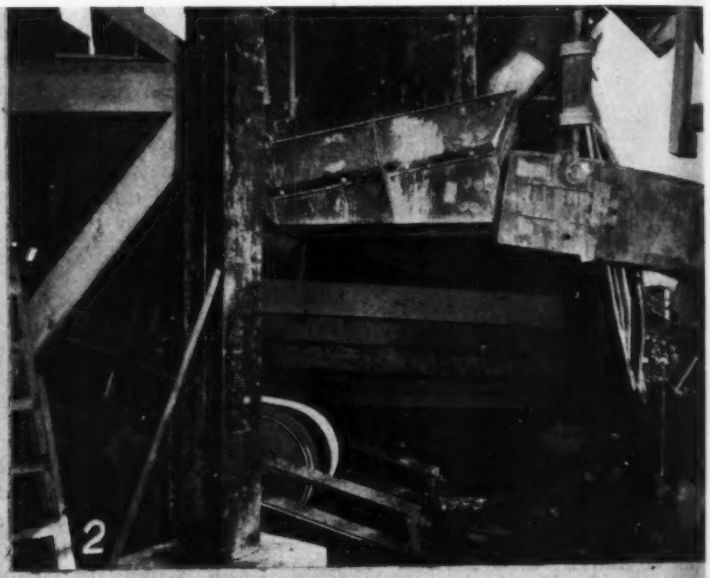
The throughs from screen No. 4 go to a 4- by 10-ft. Ripl-Flo 2-deck screen (No. 5) on which only one deck, with ⅛-in. wire cloth, is ordinarily used. Two sizes, one of them minus- ⅛-in. agstone, are chuted to separate storage compartments.

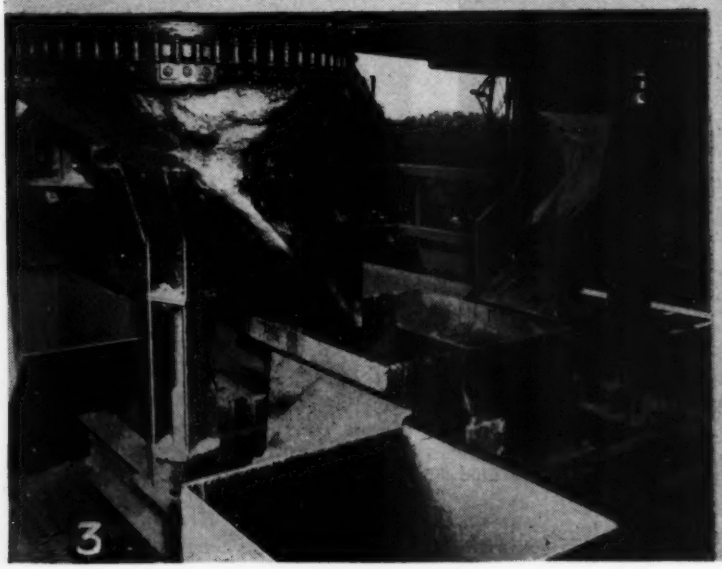
This Kern radial storage system has six ground-level storage compartments, each with a live-storage capacity of 250 tons. Originally the tower was equipped with a scraper system of storage and recovery with a head tower operating on a 250-ft. radius. Now a tractor with a bulldozer is used inside this radius, which makes possible a maximum dead storage capacity of about 150,000 tons.

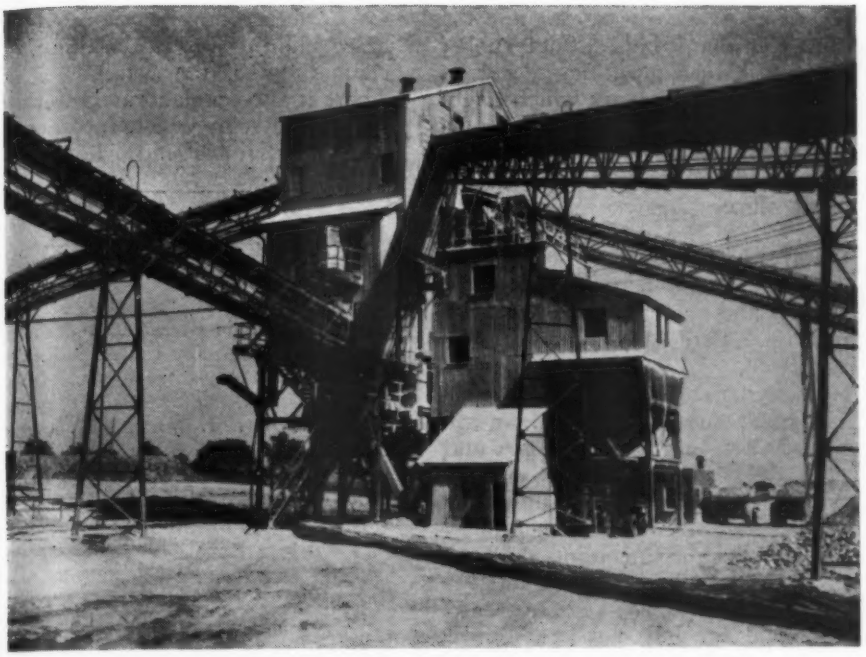
The various sizes of stored stone are discharged by gravity from the live storage sections into a cylindrical central compartment through

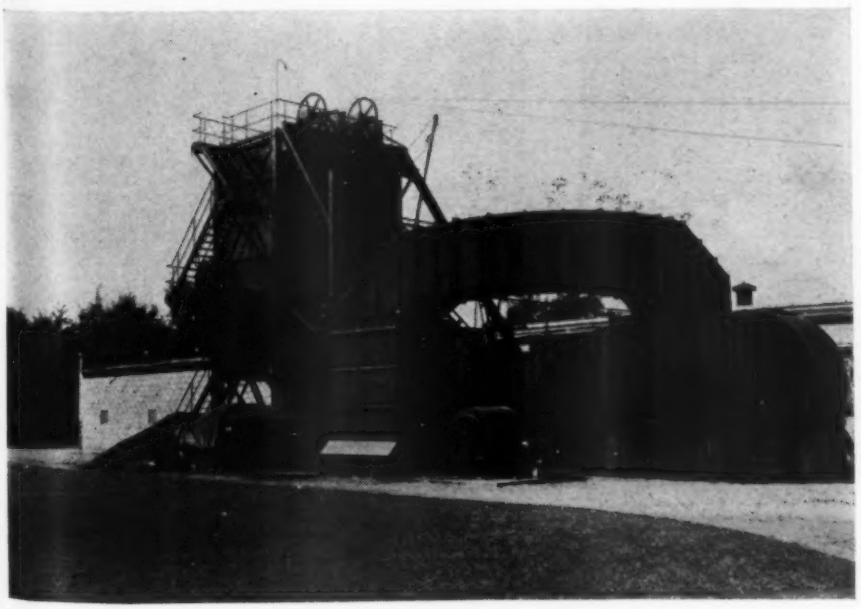
1. The other hammer-mill used for producing agstone.
2. The electric vibrating feeder from tipple onto No. 1 belt conveyor.
3. Two of the revolving spouts used to distribute products into bins.
4. One of the vibrating screens used in this plant.







separate arc gates which are operated by electric motors controlled from a control station on the tower. Blending of the various sizes is accomplished by means of manually-controlled sliding gates ahead of the arc gates. These sliding gates are marked to give various rates of feed and when they are set for a desired blend it is necessary only to operate the required arc gates. When a change in blend is desired the operator needs only to enter the center compartment and change the sliding gate settings.

The stone, blended or straight sizes, is discharged through the arc gates directly onto the 30-in. by 282-ft. reclaiming conveyor (No. 5) which carries it back up to the main or trolley-loading building. This conveyor discharges into a second Kern motor-operated revolving chute which now can discharge one of two ways—directly to a 20-ton surge bin for car or truck loading, or on the No. 11 finishing or cleaning screen (already described) which cleans any kiln stone shipped out commercially. The smaller commercial stone is handled in the same manner after cleaning, going either direct to railroad cars or on conveyor No. 7 to truck-loading bins.

The plant is connected by an 800-ft. siding to the main line of the Erie Railway. There are also storage tracks for empty and loaded cars, with a ¾ percent grade in favor of the load.

## MISCELLANEOUS

**Power** Electric power for these operations is brought in from the power plant at 13,000 v. This is reduced at transformers to 3,300 v. for motors over 50 hp., 440 v. for all other motors, and still lower voltages for lights.

**Water** Water is obtained from two 125-ft. deep wells, one with a Peerless and the other with a Pomona pump. These are automatically connected to a large reserve storage tank.

**Air** Compressed air is supplied for all operations above and below ground by three air compressors. Two are Bury 850-c.f.m. ma-

• Top: The main plant building. Conveyors are, from left to right: from "A" storage tower; to truck-loading bins; from mine tipple; from "B" storage.
• Center: The "A" radial storage tower showing feed conveyor from main building and reclaiming conveyor to same.
• Left: The mine ventilating fan with headframe of No. 2 mine shaft at left and change-house ventilating fan in foreground.

chines and the other is an 1800-c.f.m. Ingersoll-Rand.

**Control** An outstanding feature of this operation is the complete interlocking electrical control system which centers in a Westinghouse automatic control board in the control tower at the top of the main building. This board controls all the conveyors, chutes, screens, bin gates, etc., and has on it lights and flow lines which show the operator at a glance what equipment is in operation and where the material is going. The conveyors, screens, hammer-mills, etc., are also interlocked so that they stop in sequence whenever any unit breaks down. The operator also has two telephones which keep him in touch with the shipping clerk, the mine crusher room, the main chemical plant office, and outside.

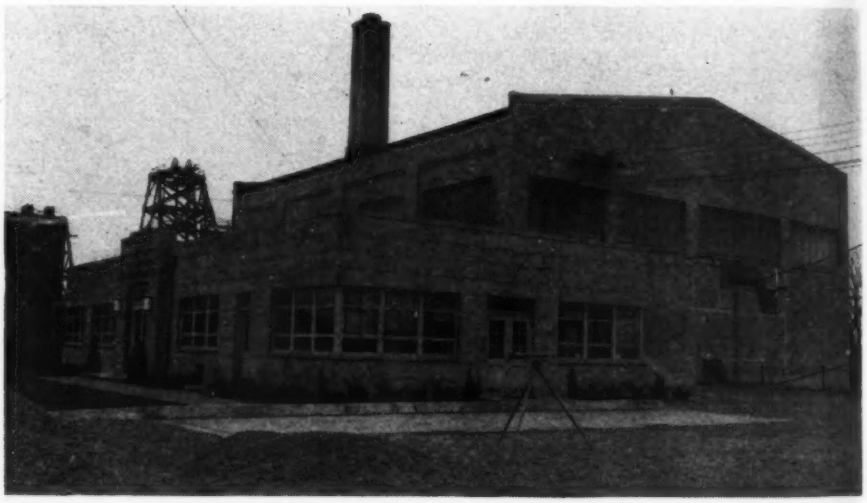
**Structures** In the entire operation steel and concrete construction is used wherever possible. The office and the various service buildings are built of concrete block and brick. Columbia cement from the company's plant near Zanesville, Ohio, is used throughout. The buildings are roofed with Careystone built-up roofing made by another subsidiary of the company.

**Drives** The vibrating screens are all driven by Allis-Chalmers open-type motors through Texrope drives. All conveyors are driven by Westinghouse motors through Philadelphia gear reducers. The conveyors, idlers and pulleys are Chain Belt Rex-Stearns. The pulleys are lagged, and screw-type conveyor takeups are used. All inclined conveyors are equipped with band-brake type automatic backstops.

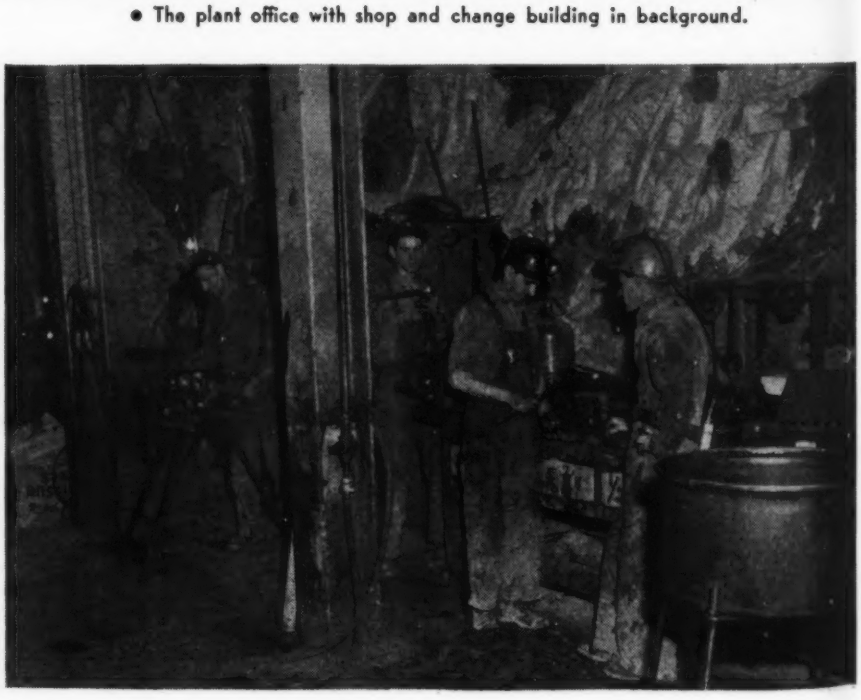
**Safety** Every possible safety precaution is taken in the mine and plant. As is evident in the description of the operations every possible mechanical step has been taken to make the equipment and operations safe, efficient and automatic, eliminating many of the hazards found in plants where most operations are done manually. Railings and safety guards are provided at all hazardous points and the workers are thoroughly trained in safety methods and first aid routine. The workers in the mine are also equipped with Mine Safety Appliance Co. hard hats, safety rubber boots and cap lamps. Safety goggles are prescribed for work which might endanger the eyes. Completely-equipped first-aid stations are provided both in the mine and at the plant office.

**Comfort** Everything possible has also been done for the health and comfort of the employees. Pure drinking water is circulated throughout the entire plant and mine, with water coolers located at many points. There are also modern underground toilet and wash room facilities. The modern change house at the head of the service shaft also has complete facilities of all kinds including showers, circular wash basins, and lockers for 200 men. The lockers are ventilated and the building is equipped with an exhaust fan.

A central heating plant under the office building serves the office, the change house, the warehouse, etc. There is also an elaborate sewer and drainage system which incorporates a dosing chamber and a filter bed.



• The plant office with shop and change building in background.



• A corner of the complete repair and blacksmith shop in the mine.

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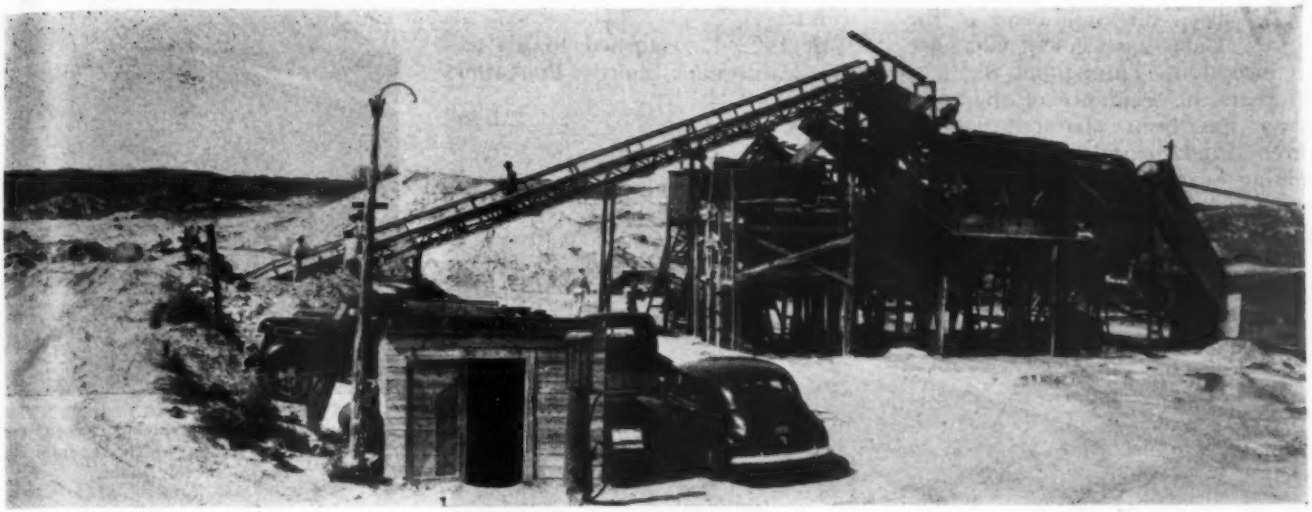
### Alaska's Mineral Resources Basis of Future Industries

Alaska's mineral resources are sufficiently varied in character to form the basis for a much more general industrialization than has yet taken place in the Territory, according to a U. S. Bureau of Mines report. During the 80 years of United States possession, Alaska has added nearly two billion dollars to the national wealth. In a U. S. Bureau of Mines survey it was shown that the mining industries were adding $24,000,000 annually to the national income. The survey discusses available data on nonmetallic minerals, including asbestos, barite, clays, fluorspar, garnet, gypsum, limestone and marble, sand and gravel, jade, and sulphur.

# Texas Plant Supplies Scarce Gravel For Construction Work

By ROBERT W. SPAKE



another ON THE SPOT report

GOOD sand and gravel deposits are rare in the Neueces County area in Texas. This county, bordering as it does on the Gulf of Mexico, has lent itself rather to the formation of a sandy soil which has little if any value as a commercial product. The Heldenfels Bros. Company has been fortunate, therefore, in locating four excellent pits at varying distances around the city of Corpus Christi, the location of their home office, and center of Neueces county.

Closest is the pit and plant near Calallen, Tex., 15 miles from the city, and but a few miles from a railroad. Roughly 400 cu.-yds. of sand and 100 cu.-yds. of gravel are recovered daily at this plant, with the products finding a ready market as masons sand, road material, etc.

Material is taken from a pit deposit by a Northwest dragline using a Page Engineering Co. 1¼-cu.-yd. bucket, which pulls the sand from well below water level. The dragline dumps directly into Dodge 4-cu.-yd. dump trucks which carry the material a short distance to the plant proper, and discharge their loads through a 6-in. grizzly into a Pioneer surge hopper.

• General view of the Heldenfels Bros. sand and gravel plant near Corpus Christi, Texas.

Aggregate in the hopper rests over a 24-in. Goodyear belt, running on Pioneer troughing idlers, and is fed onto the belt, and into the plant at varying rates by means of an adjustable gate.

This 65-ft. belt discharges directly onto a Pioneer washing screen which diverts concrete and masons sand into two separate plant-made dehydrators, one on either side of the screen structure. Excess wash water and suspended fines go over a weir in the dehydrator and are piped to a large ditch which flows into a settling pond.

One of the old pits on the site, which has since filled with water, is used both as a settling pond and a source of fresh water. The water table in this area is quite high, and no difficulty has been experienced with a shortage of water, particu-

(*Continued on page* 106)

• Right: One of the company draglines brings material from below water level. The 4 cu. yd. truck is waiting to be loaded.

• A tractor-loader dumps material from a stockpile into one of the company trucks.

# Men of the Industry—W. W. Mein Of the Calaveras Cement Co.

WILLIAM Wallace Mein has been directing head of the Calaveras Cement Co. since its inception. Throughout the past 25 years, his guidance of the company has been characterized by three fundamentals of successful mining—careful handling of men, money, and his own special brand of engineering resourcefulness. Today his methods of quarry-reserve control, which can be traced back to earlier experience gained from operating gold mines, are models for modern mining practice.

Mr. Mein was born in Nevada City, Calif., in 1873, the son of Captain Thomas and Mary Swift Mein. As a young man, he accompanied his father on gold mining trips in California and Alaska. The mining atmosphere surrounding his boyhood stamped him with an interest which has never left him.

In 1894 he traveled with his father to the Rand in South Africa. There, after a preliminary period of general mining experience, he became the manager of the chlorination of gold ores at the Robinson Mine at Johannesburg.

Young Will Mein returned to California in 1896, well steeped in practical mining lore, and entered the University of California. Four years later he graduated with a B. S. degree. Activities in his undergraduate years included: singles player on the championship tennis team; winner of the California "C"; membership in Beta Theta Pi, social fraternity, and Sigma Xi, technical society.

After completing his formal education in 1900, Mr. Mein returned to South Africa and for three years served as manager of the Durban Roddeport Deep Mines. In 1903 he was promoted to the position of manager of the Robinson Gold Mining Co. and in 1907, he became general manager of the Central Administration Mines. In that year he married Frances Williams, daughter of the man who developed the now famous South African diamond mines.

He returned to the United States to become consulting engineer for the Dome Mines, International Nickel, and the Canadian Mining & Exploration Co. With the outbreak of World War I, he resigned from his position as consultant and joined the Department of Agriculture as a dollar-a-year assistant secretary.

In 1922 he returned to his native California. Shortly thereafter,

William Wallace Mein
President, Calaveras Cement Co.

Mr. Mein became interested in rich limestone formations located in the foothills of the Sierra Mountains. When his assays proved that these deposits were well suited for the manufacture of portland cement, Mr. Mein organized the Calaveras Cement Co. Today he is president and chairman of the board of the company. Associated with him in the Calaveras company are his two sons; William Wallace Mein, Jr., vice-president; and Gardner Williams Mein, purchasing agent.

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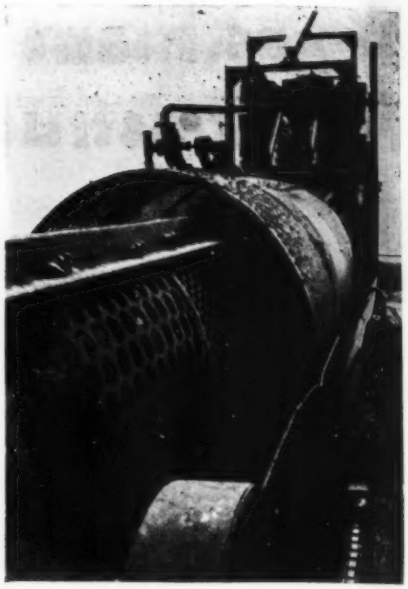
## Texas Plant

(*From page* 105)

larly since much of it is re-used.

Oversize from the washing screen falls into a large Pioneer revolving screen, and is split into three coarse sizes of gravel: ¼-in. to ⅝-in., ⅝-in. to 1½-in., and plus 1½-in.—these separations are binned according to size, and are loaded out in trucks as needed. The bins are high enough that the trucks may drive beneath them, and so load directly. When production at the plant exceeds the immediate demand, material is stockpiled in a worked-over area a short distance from the plant.



• Foreground, the revolving screen, and rear, vibrating screen which separate the gravel in this plant.

A second Northwest dragline is used for this purpose, moving the material from the truck dump area into large piles.

Trucks are loaded from the stockpiles by a Hough loader, which is also used for other general work around the plant. This versatile little machine has proven indispensable, according to L. M. Taylor, plant superintendent.

All machinery in the plant proper is driven by flat belts powered by a Caterpillar Sixty gasoline engine which has been in service for the eleven years that the plant has been in operation.

Wash water for the screening operation is drawn from the settling pond by an Alamo Iron Works 6-in. centrifugal pump. Maintenance on

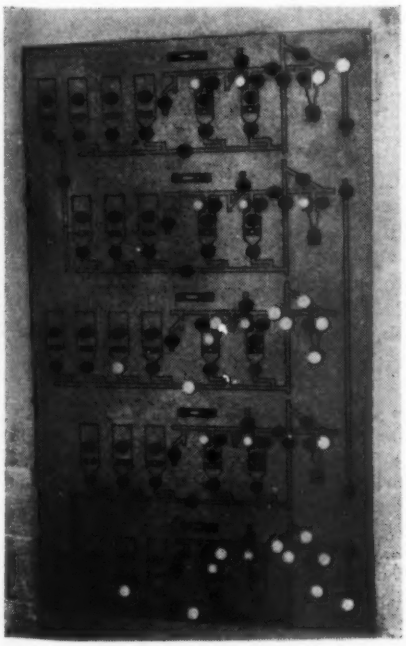
• L. M. Taylor, Calallr ı plant superintendent, stands by the pickup truck used for interplant transportation.

trucks and machinery is performed in the small but well equipped shop at the plant.

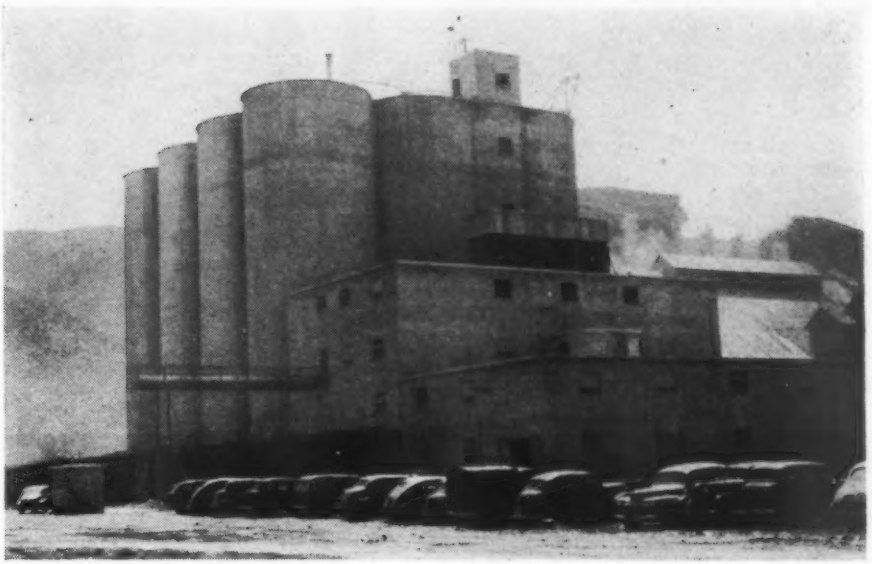
# New Packhouse of Ideal Cement Co. At Devil's Slide Plant in Operation

THE Ideal Cement Company has begun a plant improvement and modification program at its Devil's Slide (Utah) plant by construction of new cement storage silos and a packhouse. Insufficient storage capacity and inability to pack several brands efficiently led to the retirement of the old packhouse.

With the new packing equipment several kinds of cement can be quickly packed in a single railroad car or truck. In changing the cement brands being packed, the operator merely moves to another packing machine or can quickly choose from two brands on one machine. Five 4-tube Bates packers are installed for discharge to single-line, three-section reversible wire conveyors for loading at either side of the packhouse. Each packer has an identical independent conveying system to move cement from storage. A General Electric Cabinetrol substation, centrally located, houses all starters and switchgear which are remote controlled from each packer or either of the two bulk-loading weigh stations. The packer foreman can visualize all equipment operation and cement flow by glancing at a large indicating light flow panel. (See illustration below.) Possibility of contamination by mixing of cement types has been practically eliminated by the five independent packer systems, the spill return equipment, the dust collector arrangement, and numerous indicating light installations. This equipment is described in more detail later.



• The flow panel in the foreman's office, which affords, by means of red and green lights, an accurate picture of all cement flow and discloses any possible errors.



• A general view of the Ideal Cement Company's new storage silos and packhouse at Devil's Slide, Utah.

The reinforced-concrete structure includes packhouse and 12 storage silos 30 ft. in diameter and 90 ft. high (three rows of four each) with six interstice bins. There are ten 600-bbl. circulating storage bins, two on each conveying system. These 28 bins provide a storage capacity of approximately 175,000 bbl. All storage bins have 60-deg. cone bottoms with air agitation provision to assure full cement withdrawal. Each bin is provided with a hand-wheel slide gate and a 12-in. half-pitch screw feeder with a capacity of 300 bbl. per hour.

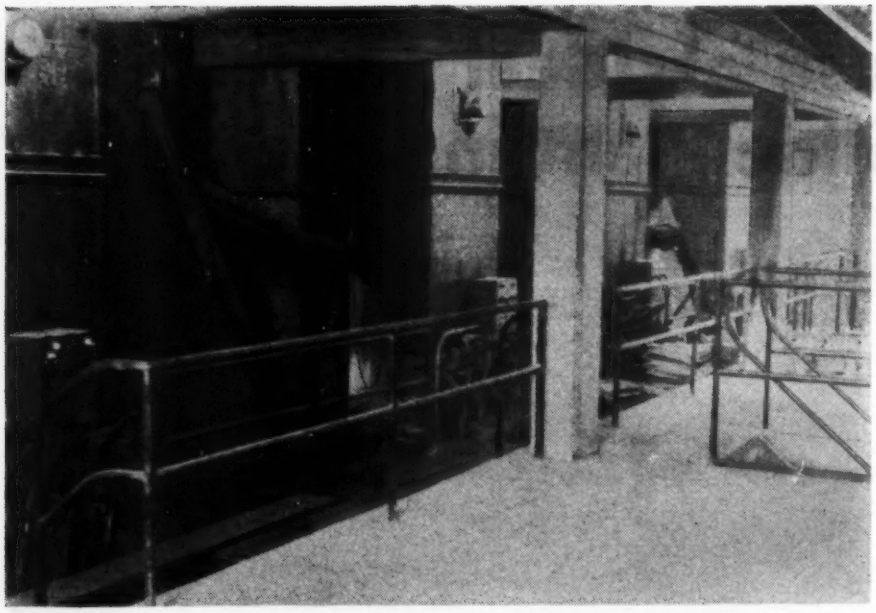
Adjacent to the north end of the silos is the 85- by 105-ft. packhouse. A 5 ft. 9 in. loading dock is provided on all three sides. Two railroad tracks are located on one side of the structure and one on the other. Forty-six feet of the packhouse adjacent to the silos is used for packer line, conveying equipment, and the 600-bbl. circulating storage bins. Four floors in addition to the basement were necessary for this length to house the dust collector and equipment. The rest of the packhouse has two floors and a basement.

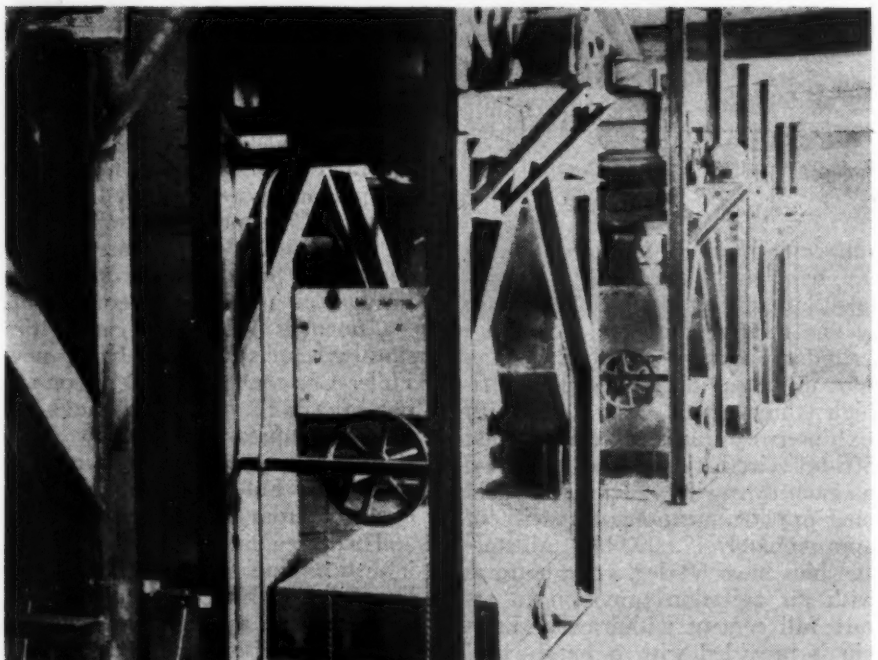
The structure was detailed and built by J. T. McDowell & Sons, contractors. Except as noted, all equipment was designed by the Ideal Cement Co. under the supervision of George F. Wiley, general engineer. The Stearns-Roger Manufacturing Co. installed the equipment.

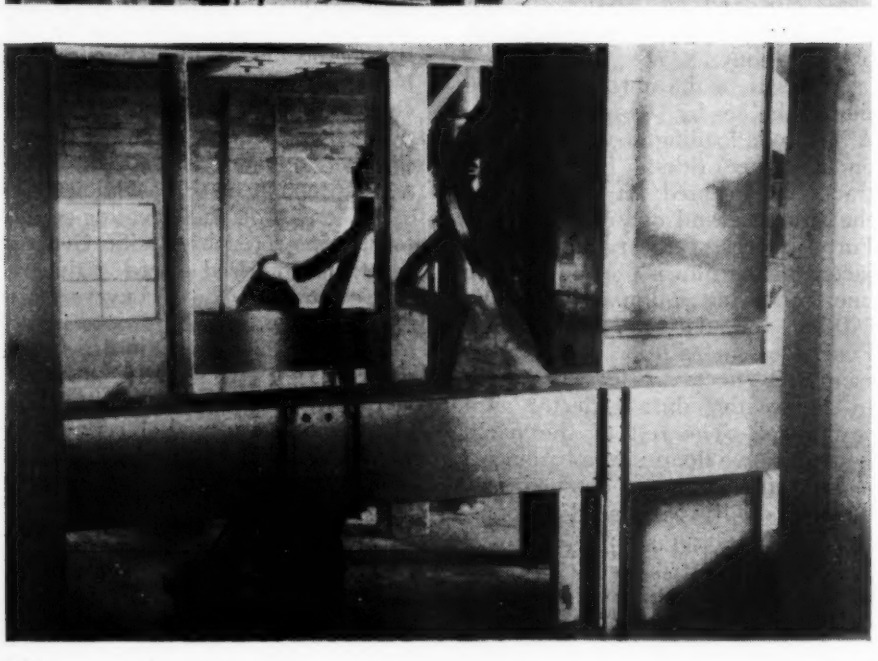
Cement is delivered to any of the silos or interstice bins by a new Fuller Co. conveying system consisting of a 6-H pump and a C-150 rotary compressor. Delivery selection is accomplished by two- and three-way Fuller valves manually operated from the silo roof.

The three lines of silos and two interstice lines comprise the five lines, each with an independent conveying system as mentioned. Figure 1 shows an isometric sketch of a typical conveying system. Note that the two far-corner silos can be fed to the silo line or the interstice line by a relatively easy change of screw conveyor flight. These two silos are normally considered a part of the respective interstice lines. Figure 2 is a cross section of the packhouse.

All conveying and elevating equipment is powered by Pacific General Electric motorized speed reducers. All feeders and No. 3 conveyors are direct driven, while sprockets and Link-Belt RC-180 chain-drive the other conveyors and elevators. Dodge Timken Type C anti-friction pillow blocks are used on screw conveyors and elevator drive shafts. All conveying system screw conveyor flights are Jeffrey 18-in.-dia. with ¼-in.-thick flights mounted on 4-in. extra-heavy pipe. Screw conveyor housings are of steel or concrete with angle troughs provided to re-







ceive the lipped conveyor covers.

Each No. 1 screw conveyor delivers cement from any storage bin feeder on that line to the respective double-chain continuous 18-in. bucket elevator, where it is elevated to the fourth packhouse floor and discharged across a 2- by 5-ft. single-deck dust-tight Productive Equipment Co. Selectro vibrating screen. Tramp iron or miscellaneous materials discharge across the screen into a small closed hopper for periodic removal. The cement drops through a pull-chain-operated Link-Belt rotary valve to the 28-bbl. bin immediately above the packer. If this bin is full or the valve closed, the No. 2 conveyor moves the cement back to drop into either circulating bin or either bulk-loading screw conveyor. Each No. 2 conveyor has six bottom openings. The first feeds the packer bin as mentioned. The openings to each circulating bin have Link-Belt rotary valves which are motor operated. Lever hand-operated slide gates are located at the openings to each bulk-loading screw conveyor. The sixth opening connects by gravity chute down to the respective No. 1 screw conveyors for returning any cement carryover past the other openings.

Each packer bin directly feeds a 4-tube Bates valve bag packer. As mentioned previously, the five packers discharge bagged cement to single-line, three-section woven-wire reversible belt conveyors for delivery at either or both sides of the packhouse. Live-roll gravity conveyors with a hinged drop section receive the bags from either side belt conveyor to permit tabling inside railroad car or truck. A start-and-stop button for each of the three belt conveyors is located on the table at each loading point. The center belt conveyor serves the three inside packers, while the two outside packers discharge to the respective short belt.

Weigh stations for checking bag weights are provided adjacent to each short belt at the extreme sides of the packer belt line. These are equipped with Fairbanks-Morse 150-lb. automatic dial bench scales.

Two 6-in. screw conveyors under the packer floor return spill from either loading dock to the packing

**• Top: A portion of the second floor of the packhouse, showing the packing stations.**

**• Center: This view, taken on the third floor, shows the screens, the upper portion of the packing bins and the feed end of the No. 2 conveyors.**

**• Bottom: In this view of the floor above the circulating bins are seen portions of the elevators, the No. 2 screw conveyors, collector duct-work and one motor-driven rotary valve.**

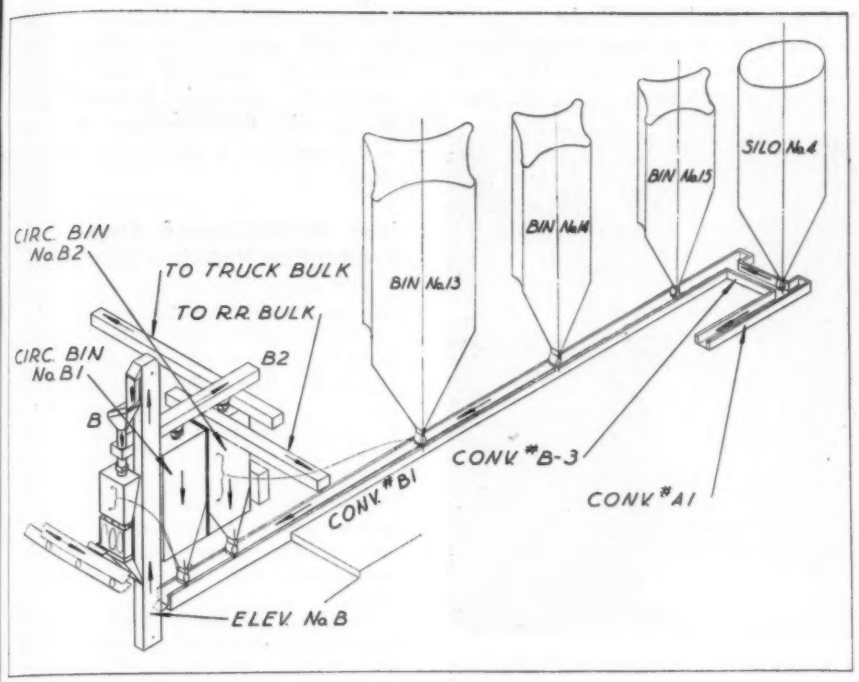



Fig. 1. A schematic diagram of the new packhouse.

system elevator, which is being operated for loading at that dock. A gravity spill chute to the elevator is also provided at each packer for returning packer spill and floor cleanup into that system.

The two bulk-loading screw conveyors, Nos. 6 and 7, run the full width of the packhouse, thereby passing under each No. 2 conveyor to permit bulk loading from any system. No. 6 conveyor moves cement out over a 30-ft. trestle to a track scale located on the second track west of the packhouse. A Fairbanks-Morse Type S, 4-section, 120-ton, 50 ft. track scale is installed at this railroad bulk loading point. The No. 7 conveyor delivers cement from the west side of the packhouse over the track to a truck scale. A Fairbanks-Morse Type S, 4-section, 50-ton, 60-ft. platform scale is provided for weighing truck bulk shipments. Reinforced-concrete construction houses each weigh station. Gravity chutes are provided for bulk loading direct from trackside silos.

The dust collector installation, consisting of five separate lines of duct work, removes dust from the packer and packer spill chutes. Each line has connections to maintain a negative pressure in the screw conveyors and elevator of each system. In each of these duct lines is a Northern Blower Axial Flow collector which deposits approximately 75 percent of the cement dust from any system back into the respective No. 2 conveyor. Solenoid-operated valves are provided on each duct system at the entrance into a common duct which leads to the No. 520 Northern Blower bag-type dust arrester and two No. 55 H. S. "Norblo" fans. These five solenoid valves and two fan motors are electrically operated through a relay system, so that any one system operates only one fan, while a second system thrown on the line will automatically start the second fan. Starting of a third system will open that duct line solenoid valve only.

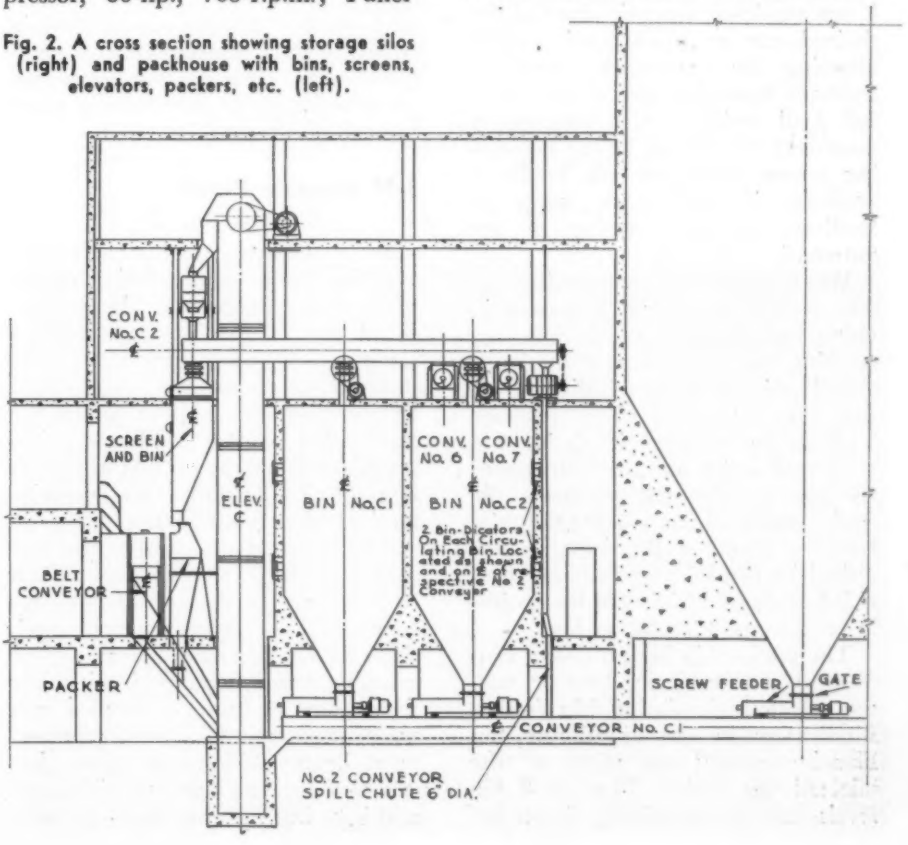
General Electric motorized speed reducers and motors for the various units are as follows: Fuller compressor, 60-hp., 705-r.p.m.; Fuller pump, 75-hp., 1150-r.p.m.; screw feeders, 5-hp., 84-r.p.m.; No. 1 conveyors, 30-hp., 100-r.p.m.; No. 2 conveyors, 10-hp., 100-r.p.m.; No. 3 conveyors, 7½-hp., 68-r.p.m.; Nos. 4 and 5 spill return conveyors, 1-hp., 68-r.p.m.; Nos. 6 and 7 bulk loading conveyors, 30-hp., 100-r.p.m.; bucket elevators, 15-hp., 56-r.p.m.; screens, 3-hp., 1750-r.p.m.; rotary valves, 1-hp., 30-r.p.m.; wire belts, 3-hp., 84-r.p.m.; dust collector fans, 20-hp., 1750-r.p.m.

Power is fed from the Utah Power & Light Co. transformer substation at 2300 volts to a 300-kv.-a. General Electric transformer at the packhouse Cabinetrol unit, where voltage is reduced to 440 for powering motors. Voltage is further reduced for lighting and indicating circuits. Circuit breakers, motor starters, and terminal boards are housed in this General Electric Cabinetrol unit substation consisting of 73 panels. The Cabinetrol is centrally located in the area between the silos and the circulating bins.

Seven control panels are strategically located for operating the cement-handling equipment. Each is equipped with red and green indicating lights to indicate selections made and equipment which is running.

A control panel at each of the five packers is fitted with two 12-circuit, 4-position selector switches, three start and stop buttons, and two feeder switches. One selector switch

Fig. 2. A cross section showing storage silos (right) and packhouse with bins, screens, elevators, packers, etc. (left).



controls the path of cement feed —Off, Bulk, Circulating Bin 1 or Circulating Bin 2—positions. The other selector switch controls the packing method—Off, Package, RR Bulk or Truck Bulk—positions. Start - and - stop buttons control the dust collector, the complete conveying system, and the packers. The two feeder switches are for stopping the silo and circulating bin feeders selected. These stops are necessary only for stopping cement flow when emptying the packer bins and conveying system at the completion of a bag packing assignment.

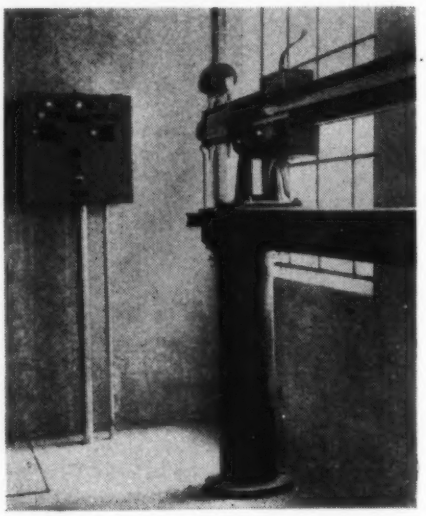
Starting of any complete conveyor system is accomplished by one control button. Starting then takes place in sequence, first the No. 2 screw conveyor, then the screen, the elevator and on to the silo feeder selected, which starts last.

A control panel at each bulk-loading scale house is fitted with one 11-circuit, 6-position selector switch and two start-and-stop buttons. The selector switch controls the selection of the tunnel or conveyor system to be utilized—A, B, C, D, E and Off —positions. One start-and-stop button controls the complete conveying system selected and the other the silo feeder selected. The latter can also be stopped by a normally-closed mercoid switch mounted on the scale mechanism, which is tripped automatically at any pre-determined set scale weight. Thus the silo feeder is automatically stopped short of the desired car or truck load weight, allowing the conveying system to continue operation and clean out at full load weight. A tabulation of poundage of cement in the conveying system from any silo feeder is available in each scale house to facilitate accurate setting of the automatic scale trip.

When control of a conveying system is transferred at a packer to either bulk-loading panel, both circulating bin valves are automatically closed and cement feed is direct from the selected silo. For package loading, the proper circulating bin is selected which automatically opens the rotary valve and connects the feeder and level controls for that bin. Level controls or Bindicators (furnished by Bin-Dicator Co.) are provided at desired high and low points in packer and circulating bins.

The packer bin high and low Bindicators automatically stop or start the selected circulating bin feeder. Bindicators in the circulating bin likewise control operation of the selected silo feeder. Thus these bin levels are automatically kept between the Bindicator limits.

The large flow panel in the foreman's office is equipped with red and green indicating lights. It gives



• A view of the interior of the track scale house, showing the equipment control panel and the scale beam.

a complete and accurate picture of all cement flow, which assists to control activities and disclose any errors in selection.

This intricate electrical system of power, control and indicating circuits was installed under the supervision of Glen Stevens, chief electrician for the plant. All circuit wiring is in conduit runs placed in the concrete.

Construction of the silos and packhouse was started in October, 1945, and the first cement was packed in April, 1947. Construction of a complete new cement - manufacturing plant adjacent to the existing plant is now under way.

## 3-M Granule Plant

(*From page* 87)

W. A. Thomas was the chief engineer in charge of the design of the plant and equipment. He was assisted by W. E. Vroman, roofing Granule Division engineer and many other members of the Central Engineering Department under the supervision of C. P. Pesek, vice-president in charge of 3-M engineering. A. L. Nienaber was superintendent of construction.

The Little Rock plant is the first 3-M granule plant with units which can be operated separately. Incorporated in the design are provisions for later installation of a third crushing and screening circuit when the volume of business justifies such an expansion. The local management beams with pride when they talk about their plant, and they have nothing but praise for its performance to date. We have nothing but high praise ourselves for this beautifully designed and superbly executed industrial development. We predict that for many a year it will constitute a mark for others to shoot at.

## Iron Blast-Furnace Slag Production Reaches New High

The production of iron blast-furnace slag in 1946 reached a new high of 16,706,792 short tons, valued at $14,869,839, a figure 32 percent above the 12,635,868 tons valued at $10,450,852 in 1945. These statistics are based on a canvass conducted by the National Slag Association. Thirty-six companies operating some 50 plants that prepare iron blast-furnace slag for commercial use were investigated. The results of this canvass were assembled in cooperation with the U.S. Bureau of Mines.

Screened air-cooled slag, the major product, increased 25 percent over the 1945 figure. The largest increases percentagewise, however, occurred in sales of slag utilized for the following purposes: lightweight aggregate, 773,150 tons, an increase of 230 percent; concrete block, 373,257 tons, 182 percent above the 1945 figure; mineral wool 629,782 tons, an increase of 57 percent. These commodities are used in the construction industry and present further evidence of the expansion of the highway and housing programs.

Although screened air-cooled iron blast-furnace slag is produced in 12 states, most of the production comes from the steel centers in Ohio, Alabama, Pennsylvania, and Illinois. Ohio, as in the previous year, was the largest single producer. Shipments of slag are made by truck, railroad, and waterway.

A total of 4,571,175 man-hours were expended by 2,023 plant and yard employees of the industry in the production of commercial slag in 1946. This excludes those assigned to administrative and sales activities.

## 2nd Quarter Bauxite Output Drops as Imports Increase

Domestic production of bauxite declined slightly in the second quarter of 1947, as compared with the first quarter, but imports established a post-war peak, according to the U. S. Bureau of Mines. The output was 358,675 long tons (304,874 tons, dried equivalent) in the second quarter, a 7 percent decline from the preceding quarter. Arkansas contributed 98 percent of the second-quarter production, and Alabama and Georgia furnished the remainder.

Imports of bauxite in the second quarter were 493,354 long tons, a gain of 14 percent over the preceding quarter. Surinam continues to be the chief source of the imports, supplying 95 percent of the total in the April-June period. For the first time since 1941 bauxite was imported from the Netherlands Indies.

# More Than 12,000 Persons Attend 35th Safety Congress

another ON THE SPOT report

THE 35th National Safety Congress and Exposition, sponsored by the National Safety Council, convened this year in Chicago for the week beginning October 6. Chanting their new battlecry, "Be careful . . . the life you save may be your own," more than 12,000 safety directors and guests spilled over four of Chicago's largest hotels for the opening

**By EDWARD BRUNENKANT**

of the second post-war Safety Congress. So large and so numerous were the safety exhibits of the safety equipment manufacturers that the space facilities of two hotels, the Stevens and the Sherman, were taxed to the limit.

Besides the general safety discussions open to all groups, smaller sectional meetings were scheduled throughout the week for technical and statistical forums of interest to each particular branch of industry.

*Cement and Quarry Section.* The cement and quarry section held two meetings on Wednesday and Thursday, October 8-9. F. J. Buffington, safety engineer of the New York Trap Rock Corporation and general chairman of the cement and quarry section, presided over these meetings.

Dan Harrington, chief of the Health and Safety Branch, U. S. Bureau of Mines, who will retire next year, reviewed the accident experience of the cement and quarry industries. The accompanying accident table is a partial resume of the statistics presented in Mr. Harrington's talk.

**Accident Record for the Cement and Quarry Industries (1945-46)**

| Kind of Stone | Number of Fatal Injuries | | Number of Non-Fatal Injuries | |
|---|---|---|---|---|
| | 1945 | 1946 | 1945 | 1946 |
| Cement | 9 | 11 | 600 | 845 |
| Limestone | 24 | 26 | 1,381 | 2,015 |
| Limestone (chief product, lime) | 8 | 3 | 961 | 1,055 |
| Marble | 2 | ..... | 164 | 180 |
| Sandstone | 2 | 2 | 309 | 335 |
| Slate | ..... | 2 | 115 | 180 |
| Granite | 7 | 3 | 396 | 510 |
| Traprock | ..... | 3 | 195 | 255 |
| Totals | 53 | 50 | 4,121 | 5,375 |

It should be noted from the foregoing accident table that although the number of fatal injuries decreased from 1945 to 1946 (53 to 50), the nonfatal injuries showed a marked increase over the same period (4,121 to 5,375). Mr. Harrington also pointed out that 31 percent of all accidents took place among men with less than six months training on the job—certainly a strong indictment against inadeqate on-the-job training.

An interesting and perhaps significant comparison between the employment records of the coal industry and the cement industry showed that only 30 percent of the coal miners were new employees, while 23 percent of all the cement employees were new workers. Within a few years, he said, the lack of trained, younger coal miners will invoke a serious handiiap on these industries. The cement industries, with a relative high percentage of young personnel seemed assured of an adequate labor supply.

Comparing the severity of injuries in the field with 1930 (1930 was taken as the base year with injury-severity rate of 100), 1946 showed the cement industry with a severity rate of 48; the quarry industry with a rate of 20; and the mining industry with an injury-severity rate of 156.

Seven-eights of the accidents in the cement industry said J. E. Farr, district supervisor of the Employers Liability Assurance Corp., Ltd., are caused by unsafe acts. Reasons for these acts usually will be found under lack of knowledge or skill, failure to follow instructions, and physical, mental or emotional deficiencies.

Corrective measures for unsafe working practices included the following: thorough training of employees in the safe way to do a job; rigid enforcement of safety rules with disciplinary action if necessary; and a conscientious effort to place employees in proper jobs.

*Awards.* The annual presentation of the awards for winners of the clay products safety contest were made at the Wednesday meeting. The twelve plants participating in the contest reported a total exposure of over 10 million man-hours during the year. Two of the winners, Permanente Metals Corp., Brick Division, and Gladding, McBean & Co. tied for the Frst Place trophy with no reportable injury during the entire contest year. A. P. Green Fire Brick Co., Mexico, Mo., won the third place award.

It was announced that the Joseph A. Holmes Association safety award of the year would go to A. J. R. Curtis of the Portland Cement Association. This is the first time that any individual has been so honored.

*Safety, Material and Machines.* Men should get as much care and attention as the other two elements of industry — materials and machines, said D. A. Gasper, superintendent of the Canada Cement Co., Ltd. Mr. Gasper went on to say that many of the shortcomings in accident prevention result from failure to give attention to the human element in industrial activities.

It is vitally important that workers be chosen with great care, that they be given thorough training in their jobs, and that they be fully aware of safety precautions and observe them faithfully.

• F. J. Buffington congratulates Frank M. Cashin as the latter receives the First Place Safety Trophy.

# Adaptation of War Surplus Equipment Facilitates Dredging Installation

another ON THE SPOT report

By ROBERT W. SPAKE

FOR the past 25 years the Standard Gravel Company, of Franklinton, La., has been working a gravel deposit near that town by means of a hydraulic dredge. Recently it appeared that the deposit was worked to its economic limit, and the partners in the company, Heyward and John B. Green, decided to move the entire plant to a better location. A likely deposit along the Illinos Central railroad was selected, and equipment for the new plant was purchased.

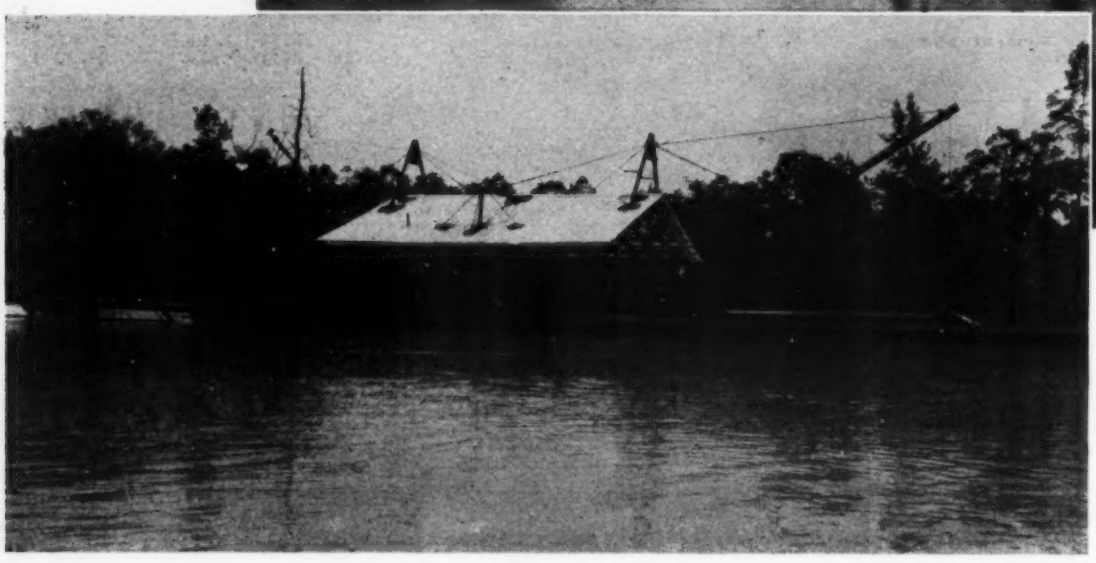
Since complete dredges were very difficult to obtain just at the close of the war, the Greens explored the possibilities of war surplus material. It was found that a great number of nesting barges, 10 ft. by 20-ft., could be obtained reasonably, and plans went ahead to construct the new dredge with these. Further exploration made it apparent that if other war surplus items, such as LCVP's (Landing craft; vehicle, personnel) and life rafts, were used, together with a certain amount of equipment from the old plant, a new dredging installation could be set up quickly and comparatively inexpensively.

A base made from eight of the nesting barge sections welded together was used to form the dredge hull, and a sturdy roof of timbers and Reynolds corrugated aluminum roofing was erected for protection against the heavy semi-tropical rains.

An A-frame was erected at either end of the raft, cross braced to a U-frame at the center of the hull. I-beams projecting from either end of the craft serve as gantries—on the bow to raise and lower the suction ladder, on the stern to support the discharge pipe.

Suction is provided by a 12-in. Amsco centrifugal pump, which is driven by a 350-hp. Westinghouse electric motor. Material is broken loose from the "working face" by a water jet supplied by a 3-in. Allis-Chalmers centrifugal pump, driven by a 50-hp. General Electric motor. All of this equipment was used in the old operation, and was transferred to the new dredge. Electric power is supplied by a transmission line mounted on poles stepped into the surplus Navy life rafts, now in use

• Right: The pipeline to the plant from the dredge at the Standard Gravel Company's plant, Franklinton, La. The pipeline floats on pontoons made from surplus Navy life rafts.



• Left: A view of the company's dredge, which rests upon a base made from eight barge sections. The latter were also surplus war material.

as discharge pipe pontoons. These pontoons are set 25 or 30 feet apart, floating in the lake created by the dredge, and carry the 12-in. discharge pipe back to one or both of the desanding plants. Two of these plants are now in operation, and are used to separate sand and gravel so that they may be handled separately, or combined with excess sand going to waste. Roughly 50 cars of semi-finished material can be stored in the water at these plants, to be picked up later by either a 6-in. electric dredge, or by a 10-in. dredge powered by a General Motors diesel engine from one of the LCVP's. The 10-in. diesel dredge can also be used at the "working face" to supply the desanding plants.

A screening plant is used to prepare this semi-finished material for shipment. This plant was made up on the site, in large part from sections of the nesting barges, and plating from the LCVP's. It is large enough to permit two sets of railroad tracks to pass under it, permitting direct gravity loading of gondola cars. At least two and sometimes three cars may be loaded simultaneously. Plant capacity is about 25 cars per day, when only one shift is worked, which is normal procedure here.

When the material is relayed from wet storage to the screening plant at the railroad by the 6-in. or 10-in. dredge, it is discharged onto gravity screens and a two-deck vibrating screen. These screens dewater the material, split the coarse aggregate into four bins by sizes, and put either mason's or concrete sand into a large bin above the tracks. Excess water and undesirable sand go back into the lake.

A belt conveyor runs beneath the bin structure to permit the blending of any combination of aggregates from the bins. Due to the fact that the conveyor is reversible it may be used to load any size of coarse aggregate or sand into trucks at one side of the plant, or can be reversed to load any size coarse aggregate into cars on the sand loading track, or to combine the coarse aggregate with sand for ballast.

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## Expansion Program

(*From page* 93)

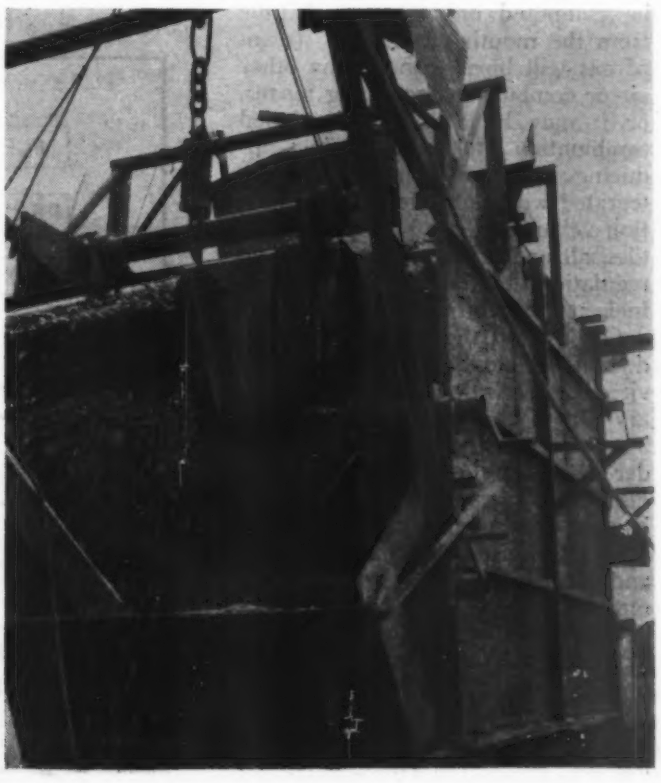
and four 7- by 24-ft. three-compartment finished-grinding mills. When the present program is completed, all of these mills will be used for finished grinding. With the four Bradley mills now in operation finished grinding capacity is in the neighborhood of 19,000 bbls. of standard cement per 24-hr. day. The mills are housed in a new 36- by 100-ft. steel frame building.

Huron's present expansion program follows close on the heels of an improvement program on its harbor and dock facilities. Finishing touches on this work were completed last spring. In addition to expanding and increasing the depth of the harbor, the old breakwater was dredged away and an entirely new cell-construction dock and breakwater were built. Practically the entire output of the mill at Alpena is shipped by water to company-owned distributing and packing plants.

Each of the 12 distributing plants is fully equipped with storage and packing facilities and each operates in conjunction with a completely-staffed district sales office. They are located at Duluth, Minn.; Green Bay and Milwaukee, Wisconsin; Alpena, Saginaw, Muskegon, Detroit and Wyandotte, Mich.; Toledo and Cleveland, Ohio; and Buffalo and Oswego, N. Y. Huron operates three lake steamers, the *S. T. Crapo,* the *John W. Boardman,* and the *Samuel Mitchell,* with a combined cargo capacity of 20,000 tons. The *S. S. Samuel Mitchell* was requisitioned by the War Shipping Administration in 1942 and taken to salt water, where she operated in the coal trade on the Atlantic Coast. She has now been taken back by Huron and is being returned to the Great Lakes, where she will be refitted for the cement trade. Throughout the lake navigating season, from April to November, inclusive, these vessels ply constantly between Alpena and various distributing plants to store sufficient finished cement at the various locations to carry through the winter months.

About 750 men are currently employed in the Alpena operations—a much higher than normal figure due to the large amount of construction work now in progress. C. P. Harris is mill manager, William MacDonald is plant superintendent, Albert Fowler is chief chemist, and H. A. Browne is chief engineer.

• Below: The screening plant and loading hoppers in this plant. Two gondola cars or a truck may be loaded at one time.
• Right: A vibrating screen dewaters and separates sand and gravel in the screening plant.



# THE LIME PLANT OPERATOR

By WOLF G. BAUER
Consulting Engineer

## NATURE, CONTROL, AND INFLUENCE OF FLAMES IN LIME BURNING

### Part III. Classification of Burner Systems

another P&Q exclusive

THE subject of burners for the conversion of fuels to flames is as diversified as it is controversial. The fundamental principles involved are, however, simpler to understand than to put into practice.

**Burner Definition** Just what is understood by a "burner"? Many readers may wonder at such a superfluous question. Yet to define a burner covering any and all fuels is not so simple, and we soon come upon the realization that perhaps it is better to speak of a burner system, rather than of just a burner. Any system or arrangement may be termed a burner or burner system which brings controlled quantities of fuel and air into such contact with each other under conditions that result in the production of flames of suitable size, quality, and direction.

A burner may be so simple as to be composed only of a fuel tube from the mouth of which a stream of gas will burn without any other air or combustion-promoting means, or it may be a highly developed combination atomizing -mixing - inducing-selfproportioning device integrated with fans, blowers, combustion chambers and impingement tiles, all under instrument automatic regulation, and handling several fuels at the same time.

Ordinarily the term "burner" does not include the means or devices for the introduction of secondary air to the combustion process, but since burner systems will be under discussion because of the often dispersed arrangement of kiln burner component parts, the arrangement of all the combustion air and its production and control means are included and implied under the term.

Under this concept, the flame-producing system for a rotary kiln includes the design of the hood and cooler air connections as well as the fuel injector mechanism, air and exhaust gas fans, and their controllers. In the case of the direct-fired large stone shaft kiln, or the convection-type small stone calciner, the fire-box arrangement is part of the burner system, while in the instance of gas-fired shaft kilns, the air and gas ducts with their ports and location in the kiln also make up the complete combustion device for the production of flames and hot gases.

Wolf G. Bauer

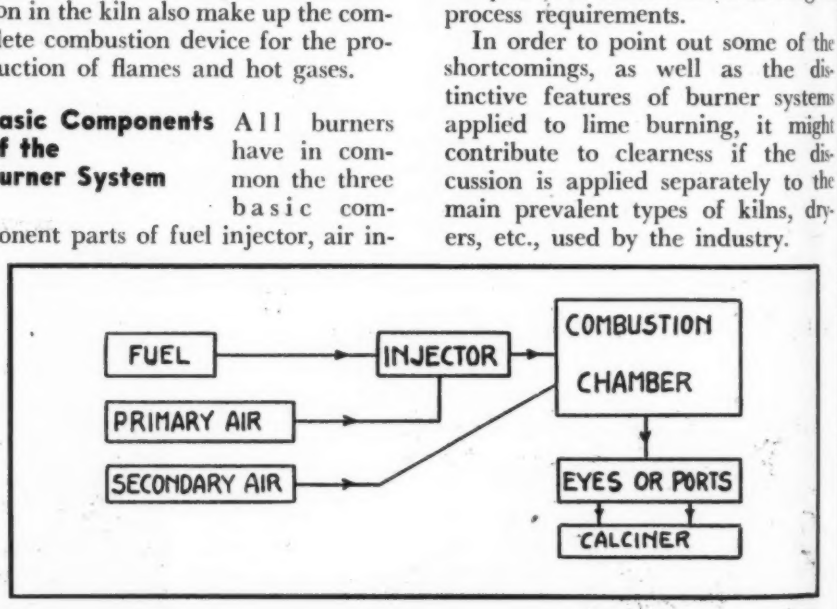
**Basic Components of the Burner System** All burners have in common the three basic component parts of fuel injector, air introduction means, and combustion promoting chamber, to wit:

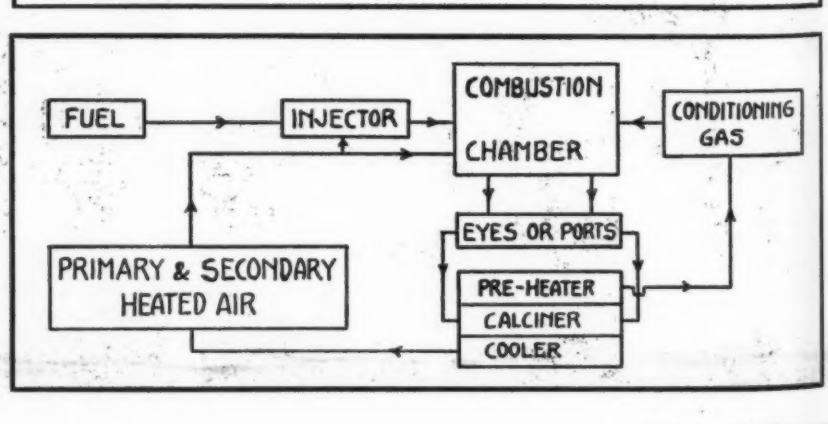
1. A fuel injection means and supply conduit terminating in one or more nozzles or ports from which the combustible issues into the combustion or flame-development chamber.

2. An air supply means and conduits with one or more strategically located escape ports supplying air either into the fuel conduit, around or near the fuel nozzle, or both, or along the path of burning gases.

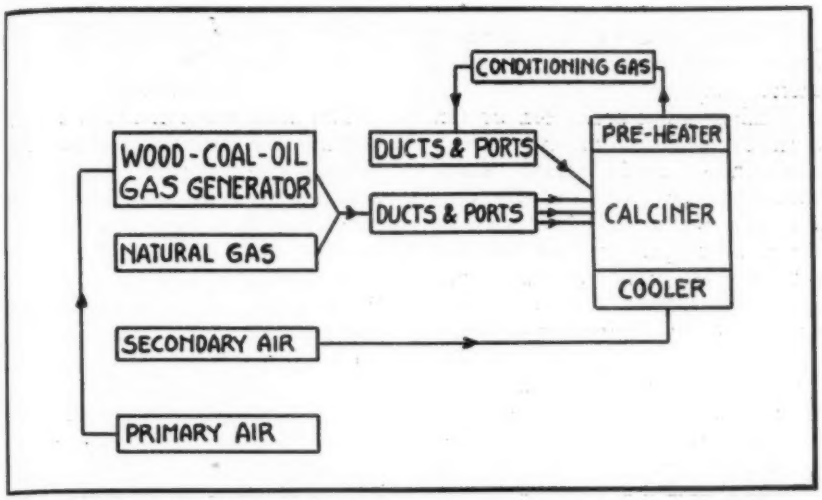
3. An ignition and combustion chamber or space in which flame development is furthered according to process requirements.

In order to point out some of the shortcomings, as well as the distinctive features of burner systems applied to lime burning, it might contribute to clearness if the discussion is applied separately to the main prevalent types of kilns, dryers, etc., used by the industry.




• Basic components for an external-combustion kiln. Above: Fig. 1a; right: Fig. 1b.




• Fig. 2. Internal obstructed-combustion kiln.

## EXTERNAL-COMBUSTION KILNS

Burner systems for two kiln types come under this classification, that for the small-capacity large stone shaft kiln, and that for the small-capacity and small stone calciners. Burner systems are here designed for burning most or all of the combustible in external combustion chambers by hand, by underfeed or overfeed stoker, by dust injection, by atomization with steam or air or mechanical means, and rather illogically also with producer and natural gas.

### Poor Features

1. Air for combustion is heated at the expense of fuel B.t.u.s.
2. High temperature development for complete combustion results in heat losses outside the kiln.
3. Sensible heat in lime is not recovered.
4. Highly heated products of combustion must be admitted to kiln charge through relatively large openings because of refractory limitations in partitions having hot wall surfaces on both sides.
5. Poor mixing and low kiln entrance velocities and pressures cause losses in unburned gases leaving the large stone kiln.

### Good Features

When modified as shown in Figure 1b, the burner system has several advantages.

1. By partial air preheating and hot gas recirculation, the recovery of a portion of the sensible heat in the lime and in the exhaust gases increases the thermal efficiency.
2. Higher flame temperatures due to partly preheated air are modified and controlled by recycling of the kiln exhaust gases, which therefore allows the use of such an added temperature regulating system.
3. When adequate provisions are made, this burner system can be adapted also for a partial diffusion-flame firing when some tertiary air is allowed to come up through the cooler to take care of final combustion within the charge.
4. One of the most recently found advantages, however, is in the application to burning lime in small stone calciners with their well-known sensitivity to localized overheating through internal combustion. The completion of combustion before introduction into the lime mass is of very distinct practical merit, even though efficiency may not be quite as high as in gas-fired internal combustion kilns.
5. The increase in gas volume and velocities resulting from recycling of the kiln exhaust gases, even though it adds to power cost in small stone calciners, is generally beneficial as a means of increasing the heat transfer coefficient, gas penetration and distribution, aside from temperature control.

## INTERNAL OBSTRUCTED-COMBUSTION KILNS

Aside from mixed feed kilns where the kiln itself acts as a complete burner system, the highly efficient internal combustion shaft kiln burner is used most successfully in instances where stone size is above 1½-in. diameter. The combustible gases are introduced through side and central burner ducts and ports.

### Poor Features

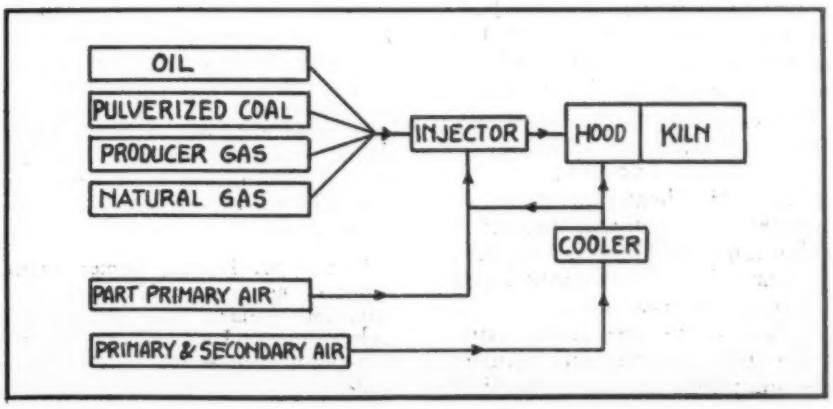
1. Depending on the available fuel, operation and control of the gasification process is sometimes difficult to regulate and synchronize with kiln operation, and adds somewhat to the complexity of the whole burning system.
2. Due to the many heterogeneously arranged large and small void spaces and constrictions in the kiln charge acting as so many individual combustion chambers, there is naturally less control over correct air-fuel gas proportion and mixing through the various sections of the kiln calcining zone; hence there is more tendency toward localized over-and underheating.
3. When kilns are drawn periodically at 1½-hour or greater intervals, as most of them are as yet, air preheat temperature fluctuates from a high point after the draw to an intermediate one before the draw. With +2000-deg. F. lime temperatures in the cooler, flame temperatures become excessive at times,[1] and cause even the highest grade brickwork to soften and melt.[2] It is only when arrangements for partly inert hot gas recirculation are incorporated in the burner system that such detrimental temperatures can be inhibited.

### Good Features

1. When the burner system is integrated as shown in Figure 3, full recovery of sensible heat in the lime is possible with natural gas, and nearly complete saving with producer gas.
2. Due to the close-contact heat release within the stone and lime particle void spaces, heat transfer is maximum and heat losses are minimum with natural gas fuel. With artificial gas from solid fuels, the heat losses in the producer somewhat offset this saving. With oil gas generated within integral kiln gasi-

[1]Bauer, Pit & Quarry, Sept. '47, p. 122.
[2]Tayler, Pit & Quarry, November, '46, p. 97.

• Fig. 3. Internal unobstructed-combustion kiln.



fying chambers, this heat loss is negligible. The combination of full use of preheated air and internal combustion in contact with the lime gives this type of burning system its chief advantage.

### INTERNAL UNOBSTRUCTED-COMBUSTION KILNS

By far the greatest tonnage of lime is burned in rotary kilns which, rather than being kilns, are actually rotating furnaces or combustion chambers. Due to the long and roomy space in which to generate and apply the heat from combustion, the burners are usually of the simplest construction. There is, however, a good deal of room for improvement, especially as many kilns burn the fuel with entirely too much turbulency and high-flame temperature. Now that well-designed direct-contact blast coolers furnish increasingly higher air preheat to the fuel, it is doubly important to consider the arrangement of fuel and secondary air inlets in conjunction with velocity and direction of the gases.

#### Poor Features

1. Since heat transfer calcination purposes must be predominantly by radiation because of inadequate convection provisions of the bed and gas contact, radiant flame burning must be practiced. This in itself is not a disadvantage except for the fact that it requires longer kilns or higher temperature construction for convection-type, direct-contact preheaters. It also makes for more complicated burner arrangement.

2. Hot products of combustion gases do not come into direct intimate contact with all the lime and stone in the ordinary rotary kiln, reaching only the top surface of the bed. This causes unequal heat absorption in various bed cross section levels.

3. Recirculation of inert hot kiln exhaust gases does not have the same value for temperature control in conjunction with regulation of flame velocity and temperature because the benefit of increased gas velocity and corresponding increased heat transfer cannot be as effectively exploited in the rotary kiln hot zone as in shaft kilns or small stone calciners.

#### Good Features

1. In this heat-generation arrangement, no external firebox or combustion chamber is required, thus simplifying construction and eliminating external losses.

2. Due to the free space extent of the kiln combustion chamber, large quantities of gases and heat input are possible with minimum friction power losses and maximum material output.

3. Fullest use of preheated air can be made without difficulties, although here, as in former cases, natural gas and oil are the only fuels with which this heat can be fully utilized, primary air for coal gasification or drying during grinding having to be diluted with extra cold air. When air instead of steam is used for oil firing, oil falls also in the same category as coal.

4. Fuel and air can be easily controlled according to lime temperature requirements because of the more continuous conveying movement of such kilns.

### SUMMARY

The basic components of a burner system were analyzed, and kiln firing systems grouped into three divisions covering present lime kilns. Some inherent advantages and disadvantages of these systems were enumerated, especially as they pertained to the working efficiency of the flames and heat produced. In following issues, ways and means of improving burner systems and flame control will be brought under discussion, along with practical data on fuel characteristics.

## PERSONAL MENTION

Royal E. Fowle

ROYAL E. FOWLE has been appointed vice-president and manager of the Granite Rock Company of Watsonville, Calif., by the firm's board of directors, to succeed A. J. WILSON, who has resigned.

Mr. Fowle has been associated with the company for the last 18 years as civil engineer and manager of the Logan, California, quarry.

SAMUEL A. GUSTAFSON has been named acting supervising engineer at Denver for the U. S. Bureau of Mines, to replace the late George E. Woodward. Mr. Gustafson has been associated with the bureau since 1941.

DAVID O. HOWE, construction and maintenance supervisor at the Cape Girardeau plant of the Marquette Cement Manufacturing Company, has resigned from his position there. He will be engaged in a similar capacity on the staff of the Ideal Cement Company, with headquarters in Denver. Mr. Howe has been with Marquette for the last 15 years.

HERBERT W. OVERLEY, general auditor, and EDWARD J. CRANDALL, assistant traffic manager for the Louisville Cement Company were honored at a dinner in Louisville in recognition of their years of service. Mr. Overley joined the firm 60 years ago, and Mr. Crandall became an employee 40 years ago. About 35 executives of the company were present, several traveling from the New York plant to be present at the dinner. A gold service pin was presented to each of the men.

FOREST M. PESTER, former assistant editor of personnel publications of the Minnesota Mining and Manufacturing Company, St. Paul, Minn., has been named associate editor of *Construction Bulletin*.

HENRY ST. LEGER was recently named first general secretary of the International Organization for Standardization. He was formerly affiliated with the U. S. Chief Counsel for the Axis trials at Nurnberg.

D. O. ROBINSON has been appointed chief engineer, Technical Branch, Canada Cement Company, Ltd., Montreal, Que. He has been affiliated with this department since 1930 and succeeds J. M. Breen.

ALBERT H. O'NEIL has been appointed assistant sales manager of the Freeport Sulphur Company. During World War II he was a member of the War Production Board staff.

John H. Melvin

JOHN H. MELVIN, district geologist Corps of Engineers, at Omaha, Neb., has been appointed state geologist of Ohio.

Mr. Melvin has a wide background of experience in the mineral and construction industries. He was formerly an executive of the Pennsylvania Drilling Company of Pittsburgh, Pennsylvania.

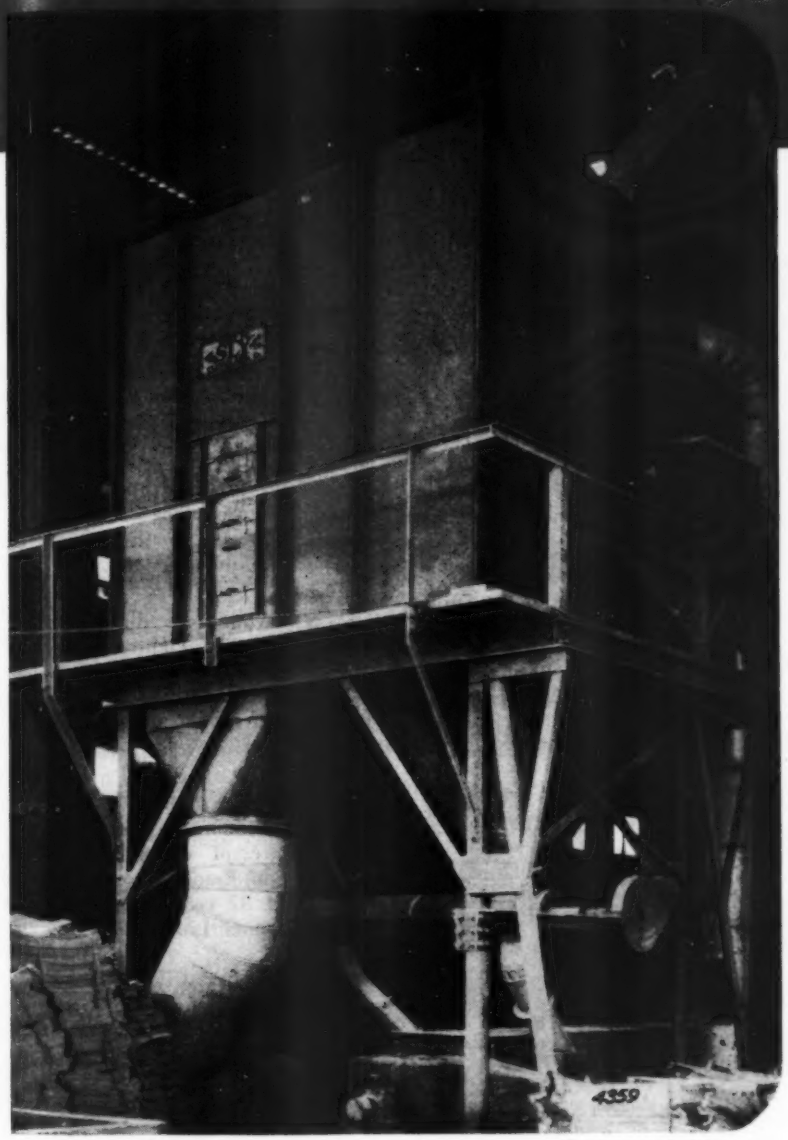
GORDON GREENE, who has been a member of the laboratory staff of Pacific Coast Aggregates headquarters in San Francisco, has been transferred to Fresno, Calif., where he is taking charge of the company's new testing laboratory at the Fresno district offices.

FRANK SOUZA, superintendent of the Corral Hollow, Calif., plant of Pacific Coast Aggregates, Inc., for many years, has taken over the operating supervision of the company's new plant at Kerlinger, which is now in partial operation. The Corral Hollow plant has been closed after 20 years in production.

PAUL A. B. SAHN has established a private practice as consulting engineer on industrial plants, with offices at 933 St. James St., Pittsburgh, Pa.

# SLY DUST Control

## Widely Used. Not Expensive



This is a typical Sly installation. Literally, hundreds of similar installations are in use in connection with production of cement, crushed stone, agricultural limestone, gypsum, asbestos, talc, feldspar, fluorspar, gold, copper and iron ore, diatomaceous earth, bauxite, etc.

Sly Dust Filters collect dust generated in such operations as crushing, grinding, screening, conveying, loading, separating, and mixing. They comply fully with the requirements of the laws and regulations of the various states.

●

*Illustration at left shows a Sly Dust Filter in the pack house of a cement plant. Several dust pipes enter the far side of the filter. The exhaust fan is located on the floor below filter. A screw conveyor automatically and continuously removes the collected cement. Hundreds of similar Sly Filters are used in cement plants and other rock product industries.*

Inexpensive to install and maintain, Sly Dust Control systems soon pay for themselves. Ask for Bulletin 98 and tell us your problem so that we can write you fully.

**THE W. W. SLY MFG. CO.**

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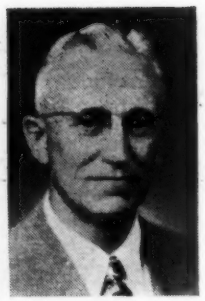
**SLY**
INDUSTRIAL DUST CONTROL

HERMAN C. HELMLE, who was formerly with the Illinois Division of Highways, has been appointed district engineer in charge of a newly-established office of The Asphalt Institute at Springfield, Ill. Mr. Helmle's territory will include Illinois, Wisconsin, Minnesota, Iowa, Missouri and Arkansas, which form a part of the institute's Division III.



H. C. Helmle

Mr. Helmle has supervised the inspection of bituminous construction in Illinois for the last 20 years. His offices will be at 520 South Sixth Street, Springfield, Ill.

C. F. Colley

CHARLES F. COLLEY has been appointed assistant plant manager at the Hannibal, Mo., plant of Universal Atlas Cement Company, United States Steel Corporation subsidiary.

Mr. Colley began working for the company in 1916 as a civil engineer at the Hannibal plant. During the first World War he served as a first lieutenant in the Coast Artillery and in 1919 returned to the Hannibal plant as an engineer. In 1928 he was appointed plant engineer and safety supervisor, which position he has filled until his appointment as assistant plant manager.

ROBERT K. THOMAS has been appointed chief chemist of the Bellefonte Division, Warner Company, Philadelphia, Pa., to succeed the late David E. Washburn. He began working for the American Lime & Stone Company, now Warner Company's Bellefonte Division, in 1935.

The appointment of ROBERT L. HUTCHISON as general superintendent for Pittsburgh Plate Glass Company's Columbia Chemical Division and for the Southern Alkali Corporation was announced today by E. T. Asplundh, vice-president in charge of the glass firm's chemical division. Southern Alkali is a subsidiary of Pittsburgh Plate Glass Company.

Mr. Hutchison has served as superintendent of the Columbia Chemical Division's alkali producing plant at Barberton, O., during the past seven years. He joined the firm in 1925 as a draftsman in the engineering department. Six years later he was placed in charge of all maintenance and construction, a position he held until his appointment as plant superintendent in 1940.

LAWRENCE K. MARSHALL is now associated with the Sierra Magnesite Company at Gabbs, Nev. He was formerly with the New Mexico School of Mines at Socorro.

SAMUEL KRAJCI, who has been technical assistant to the works manager at the Marrero, La., plant of the Celotex Corporation, has been promoted to the position of assistant to the vice-president in charge of production.

Mr. Krajci began his association with Celotex in 1926. He also served for a time as research associate at the National Bureau of Standards in Washington, D. C.

JACKMAN PALMATIER, who has been general manager of the Grand Rapids Gravel Company, Grand Rapids, Mich., since 1945, has resigned from this position and will be succeeded by NICHOLAS H. BATTJES, president, son of the late Henry N. Battjes.

Mr. Palmatier will continue his association with company in an inactive capacity as secretary and director.

E. H. KUHLMAN has been re-appointed to the South Dakota State Cement Commission for a four-year term by Governor George T. Mickelson. Last year he was appointed to fill the vacancy caused by the resignation of John Graber.

LEON H. BEEGHLY, president of the Standard Slag Company of Youngstown, O., was recently named chairman of the board of the American Businessmen's Research Foundation. He has served as a director of the organization for the last 15 years.

P. E. Duncan

PAUL E. DUNCAN has been appointed to fill the newly-created position of comptroller for Marquette Cement Manufacturing company, as announced by Marquette's president, W. A. Wecker. Prior to his elevation, Duncan had been assistant to V. J. Hanley, secretary-treasurer of the company.

With the exception of a war period spent in the U. S. Army, Mr. Duncan has been employed by Marquette since 1933. He worked in various departments of the cement manufacturing plant at Oglesby before being brought into the company's general offices in Chicago early last year.

PAUL W. FAIRCHILD recently began working on a survey of gypsum deposits in Kansas, with headquarters in Blue Rapids. He will work under the joint auspices of the Kansas State Geological survey and the department of geology of the University of Kansas.

## OBITUARIES

JOHN GIBBONS, former president and founder of the East Peoria Sand & Gravel Company and the Chillicothe Gravel Company, died recently in East Peoria, Ill. He became president of the East Peoria Sand & Gravel Company in 1924. In 1935 he founded the second firm at Chillicothe. He retired from active participation in business in 1944.

IRA TAYLOR, who was for the last six years chief stationary engineer for the U. S. Gypsum Company, died unexpectedly on August 7 at North Hudson a few hours after he had been taken to the North Hudson, N. Y., Hospital. Mr. Taylor was 57 years of age.

WILLIAM N. BOSLER, 60, assistant sales manager for the Kentucky Rock Asphalt Company, Louisville, Ky., for the last 13 years, died on August 1 at a hospital in that city.

FRANK EDWARD CONLEY, 85, founder of the Frank E. Conley Stone Company, Utica, N. Y., died recently in his home. Mr. Conley organized the stone business in 1898 in Higginsville, N. Y. He expanded the firm and operated a number of quarries producing crushed stone. At the time of his death he was retired president of the company.

MARK WOODWARD, director of the Cement and Allied Plants Division of the Vulcan Iron Works, died on August 23 in Wilkes-Barre, Pa. He suffered a fatal heart seizure.

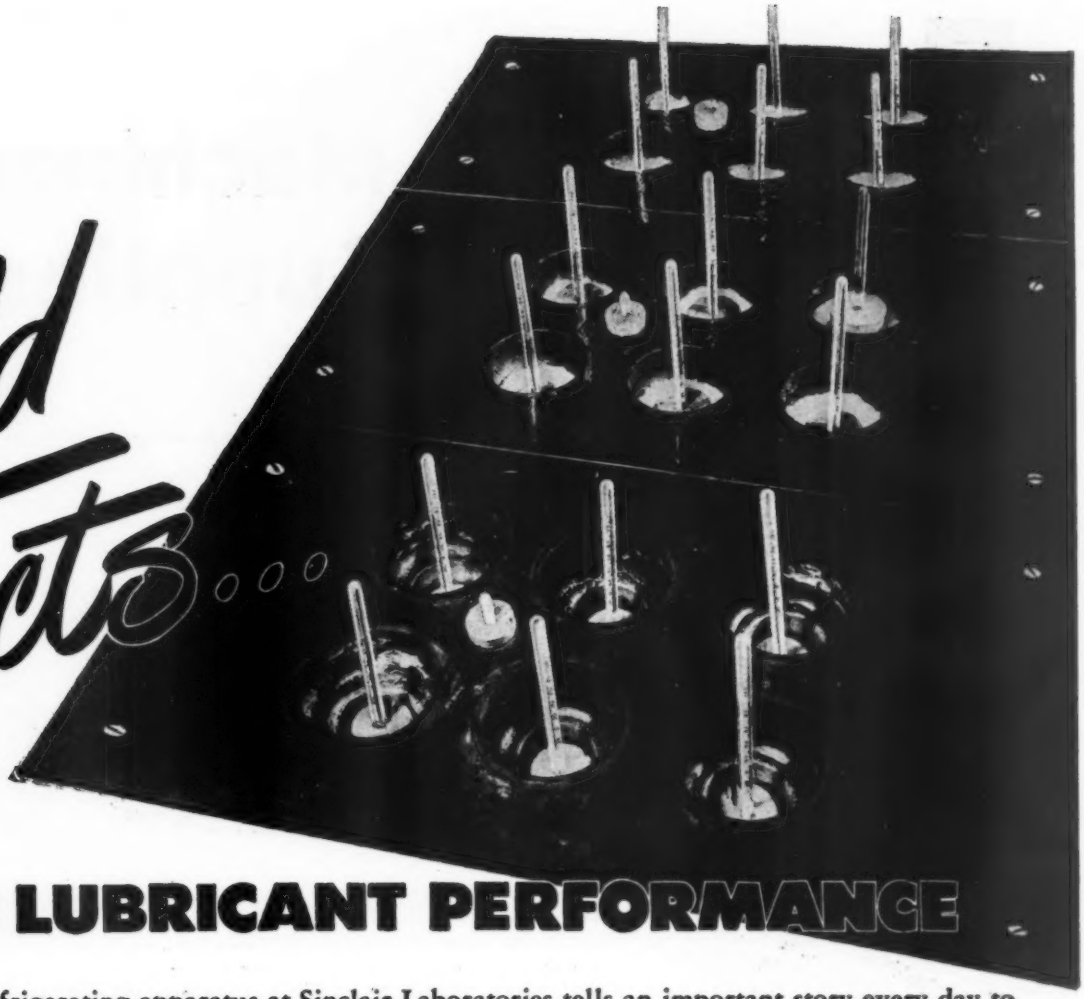
RICHARD P. DOOLAN, a pioneer San Francisco industrialist who is credited with being among the first to launch the manufacture of cement in California, died in San Francisco on August 16 at the age of 87 years. He was a partner in the Holmes Lime Company.

GORDON J. REIF, secretary-treasurer of the Ozaukee Sand and Gravel Company of Grafton, Wis., died on September 1 at Port Washington, Wis. He was 29 years of age.

HOWARD W. MAXWELL, who was for more than 20 years vice-president of the Atlas Portland Cement Company, died in Glen Cove, N. Y., on September 13. He was the son of the late J. Rogers Maxwell, founder of the company.

Mr. Maxwell joined the staff of Atlas in 1907 and retired in 1929, when the firm was taken over by the United States Steel Corporation and became the Universal Atlas Cement Company. He was 74 years of age.

HARRY ANDERSON, electrical superintendent for the Kosmos Portland Cement Company at Kosmosdale, Ky., died unexpectedly after a heart attack in his office on September 4. Mr. Anderson was 66 years of age.



# Cold Facts...

# ...ON LUBRICANT PERFORMANCE

This special refrigerating apparatus at Sinclair Laboratories tells an important story every day to research experts and refinery control technicians.

The thermometers, shown above inserted in lubricating oil samples, record temperature as cold is increased in the special refrigerating apparatus. Trained observers check the samples frequently, test for pour point. Sinclair, thus, makes sure that its lubricants retain full protective qualities even at sub-zero temperatures . . . when your specific application demands.

Such constant manufacturing control and research assures you that famous Sinclair lubricants . . . and all new Sinclair products . . . will give outstanding performance to meet your most exacting requirements.

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For Truck, Bus, and Tractor

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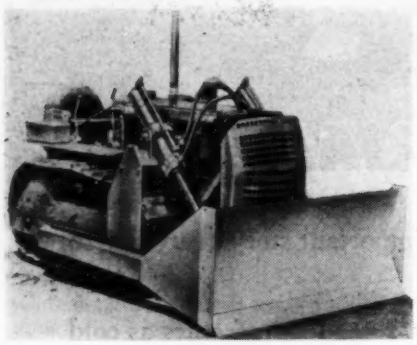
# New Machinery And Supplies

## ● New Dozer Line

The "Power-Plus" line of dozers, both straight and angle, made by the Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn., are now available for D4 and D6 "Caterpillar" tractors. "Fluid power control" is provided by the LaPlant-Choate hydraulic pump. Since withdrawing from the dozer manufacturing field, LaPlant-Choate has cooperated with Bros engineers in designing the new Power-Plus line with the hydraulic system that combines pump, valve, and oil reservoir into a single unit.



Track-mounted bulldozer.

The D4 model is reportedly the only track-mounted, direct-lift, double-acting hydraulic bulldozer with full-floating rams. It is the first D4 with positive down pressure.

The D6 dozer is frame mounted and, for the first time, incorporates the new compact pump with a minimum of hydraulic piping. The new line of Power-Plus dozers will be handled through Bros, LaPlant-Choate and "Caterpillar" dealers.

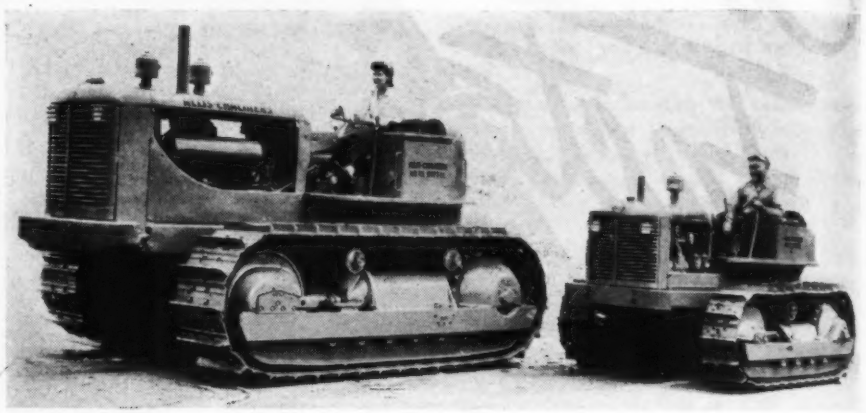
Bros engineers took over changes contemplated in the former LaPlant-Choate dozers and incorporated many of their own into pilot models which have been tested in the field for many weeks.

On the straight models a new reinforced fan-tail box construction eliminates multiple welded pieces previously used. The moldboard fan-tail design is offset from the push frame and made wider for easier maneuvering.

The new straddle-mounted cylinder bracket assembly centers lifting power and equally distributes all working forces, thus promoting more positive control of blade and greater digging force.

A full floating hydraulic cylinder assembly permits free movement in all directions. The adjustable chevron packing gives automatic hydraulic seal, preventing oil slippage and leakage.

The hydraulic pump used on the Bros Power-Plus dozers can be completely serviced with a crescent wrench. On front-mounted units a new-style drop-hinged guard is used, permitting easy access for maintenance. D4 units can be front- or rear-mounted. D6 units are front-mounted only.



Posing beside a little HD-5 Allis-Chalmers diesel tractor, the big new HD-19 causes that model to look like a toy. Described as the "world's largest, most powerful crawler tractor," the HD-19 nevertheless has been designed for easy operator efficiency. Hydraulically-powered steering levers offer finger-tip control which takes most of the physical labor out of driving the out-size machine—as the easy pose of the fair driver indicates. For a detailed description of the 20-ton job, see PIT AND QUARRY, October, 1947, page 104.

## ● Pressure Hydrator

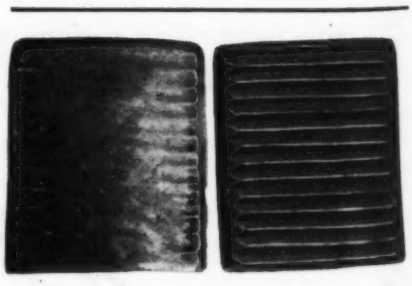
The Tayler Engineering Company of Detroit, Mich., has announced that a new and continuous process for hydrating the magnesia in dolomitic quick lime will be available soon.

The process involves the use of a pressure vessel into which quick lime and water enter in continuous feed and from which the finished lime discharges dry, free from steam and air and ready for storage or bagging. High pressure results in high capacity from a small unit, because magnesia hydrates at 125-lb. pressure in about one-third the time required at 25-lb. pressure. A given size of pressure vessel will handle three times as much output at a higher pressure.

Completely automatic controls provide for constant quality consistent only with the uniformity of the quick lime entering. The system is a product of a line research program fostered by the Tayler Engineering Service.

## ● Lightweight Hose

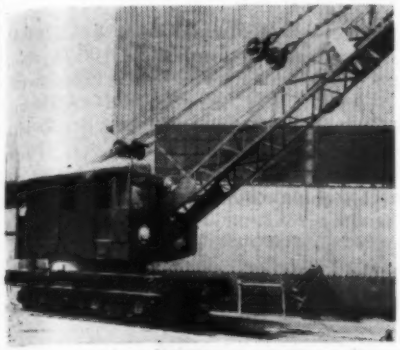
A new lightweight hose with rayon strength members and patented "Homo-Flex" construction has been designed by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. The hose, designated "Ray-Man," is successfully used for bench work with small air-operated tools where ordinary air hose is too heavy and cumbersome. It is also said to be ideal in industries requiring air for blowing or cleaning in small areas. In Ray-Man hose rayon is used as the Homo-Flex strength member, making possible an extremely light hose of great strength and flexibility. This hose is also available in an oil-proof type made with oil-resisting rubbers.



Two views of a crusher plate — before (left) and after (right)—show the difference made by application of the "Rockbit" welding process, developed by the Rockbit Sales and Service Company, 350 Depot Street, Asheville, N. C.

## New Locomotive Crane

The American Hoist and Derrick Company of St. Paul, Minn., has now perfected a completely new "Dieselectric" locomotive crane, whose design is based



Uses two kinds of power.

on a series of recent patents. Electric power is used to travel the crane along the rails, while diesel power operates the turntable and load-lifting mechanism. In addition to hook work, the American Dieselectric is used with grab bucket, grapple, magnet, and for swift and efficient car switching. Another patented feature is use of electric power from the traction generator for energizing the magnet, with over-excitation for maximum loading.

Smooth fluid starting and traveling is achieved through use of electric power on the rails. This is extremely important in locomotive crane operation, because the tremendous strain created by "jerky" starting has always been a major factor in maintenance. The electrified drive, which eliminates 7 tons of major moving and wearing parts, is said to cut maintenance as much as 50 percent and to simplify service work.

Capacity of the locomotive crane is 40 tons.

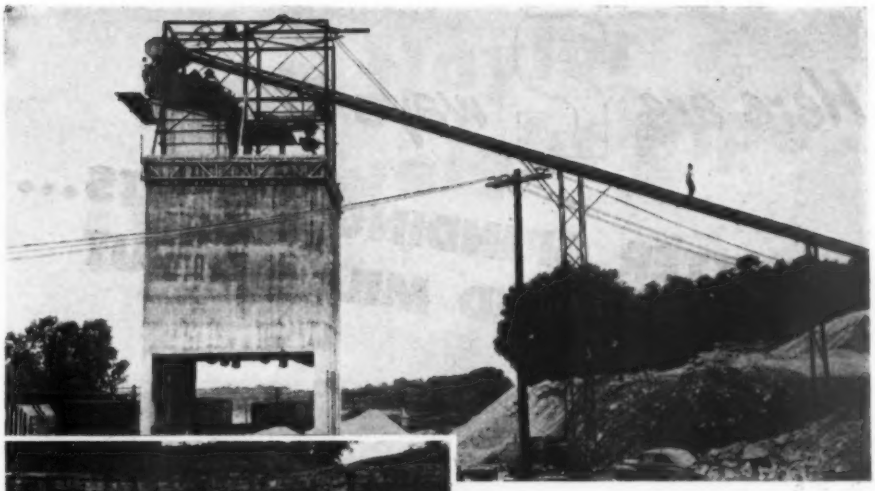
## Slide-Rule

A 12-in. slide rule for computing orifice plate bores, flow nozzles or Venturi throats, and also the rate of flow, or the differential created across the orifice plate, has been developed by the Foxboro Co., Foxboro, Mass. It can be used for all fluids, with or without seals, and covers such a wide range of flows and line sizes that it will handle almost any commercial problem. Although its average error is well within the accuracy of flow test data, it is not intended to replace computation methods where purchase and sale of fluids are involved; it is useful, however, for checking such calculations.

## Conveyor Belt

Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has announced its conveyor belt with rayon cord plies. The new product was designed to meet the needs of mines, quarries and limestone plants for a belt of higher tensile strength for increasing heavy-duty, long-lift conditions.

It is claimed that the belt troughs easily, has fiber resilience, can utilize conventional type idlers and pulleys, can be field-spliced with conventional methods and permits construction modifications to suit varying service conditions.



Top: The new Loring Quarries storage bins, with Plat-Os on top, erected over a siding of the Union Pacific railroad.

Left: For winter operations, Loring Quarries opened two tunnels into the face of their quarry.

Right: Standing between the two Plat-Os he helped install is Frank Galliher, sales engineer, English Brothers Machinery Company, Kansas City agent for the Deister Machine Company.


Equipped for

YEAR-ROUND OPERATION

PLAT-O by DEISTER

When Loring Quarries, Inc., installed a new and larger plant at their Bonner Springs, Kansas, quarry, Plat-O Vibrating Screens were chosen for the final screening job. Three important reasons for selecting Plat-Os were:

1. Their proved all-weather performance.
2. Their capacity for handling heavy loads continuously.
3. The engineering service provided by agents of the Deister Machine Company.

Investing in two 4' x 12' triple-deck Plat-O Vibrating Screens, the Loring Quarries, Inc., mounted these 15 feet above the storage bins and 75 feet above the ground. Each Plat-O produces 100 tons per hour of agricultural limestone and road rock. An inclined conveyor system, 225 feet in length, brings the crushed stone to the Plat-Os.

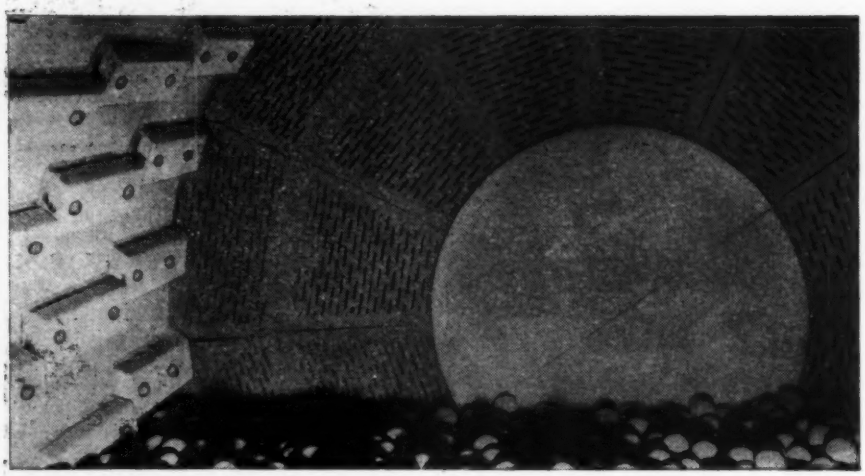
These rugged Plat-O Vibrating Screens can be engineered to your needs. For recommendations, write the Deister Machine Company, Fort Wayne 4, Indiana.

DEISTER MACHINE COMPANY

FORT WAYNE 4, INDIANA

# Here are 2 ways to get

## BETTER GRINDING RESULTS... INCREASED MILL OUTPUT



### 1. LORAIN ROLLED PLATE LININGS

On all sorts of grinding jobs, U·S·S Lorain Rolled Plate Linings are helping increase production, save time, cut costs.

Rugged, durable Lorain Linings are adaptable to any mill, in the diameter, length or thickness required.

They are quickly and easily installed. You'll find that they provide better grinding, more economically, regardless of what you grind.

U·S·S LORAIN ROLLED PLATE LININGS are available through leading grinding mill manufacturers whose names will be furnished on request.

### 2. LORAIN GRINDING BALLS

Specially made for the grinding industry—to definite specifications, U·S·S Lorain Grinding Balls are available in all standard sizes, from three-fourths to five-inch diameters.

Tough, hard and long-lasting, these balls are forged from new steel. They are accurately heat treated to withstand abrasion and impact.

It will pay you to specify U·S·S Lorain Grinding Balls for mills of all sizes, for all sorts of grinding.

**CARNEGIE-ILLINOIS STEEL CORPORATION**

*Pittsburgh and Chicago*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

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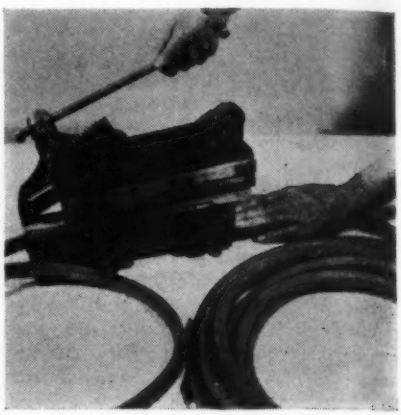
UNITED STATES STEEL


### ● Easy-to-Splice Belting

Leather V-belting which can be cut from a roll and spliced to fit any required centers is now available from the Chas. A. Schieren Company, New York, N. Y.

This V-belt is made in A, B, C and D sections and is supplied in 100-ft. rolls, packed in boxes. The belt is constructed in such a way that the side walls are of flat, full-grain leather which provides greater pulley gripping capacity. These leather V-belts are not affected by oil.

The belt can be made endless, to fit



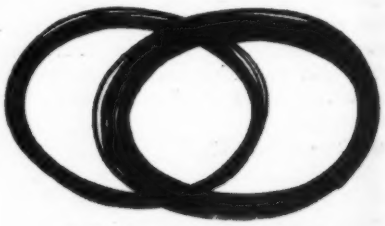
Belt cutter cuts on bias.

any drive, either by a lapped splice or by mechanical fasteners. By using a lap press and tension rods and clamps, the belt can be installed endless under any desired tension directly in the grooves on the drive. This saves tearing down drives that have outboard bearings.

The Schieren "E-Z Lap Cutter," a mistake-proof belt chopping device, also supplied by the company, enables anyone to splice a leather V-belt to factory perfection. It cuts the leather on the bias across the belt, making a long, tapering, slant-wise cut, producing the fine feather edge on the ends so necessary to a smooth-running endless belt joint.

### ● Plastic Bonded Rod

Wall Colmonoy Corporation, 19345 John Road, Detroit, Mich., announces the availability of new Colmonoy plastic bonded rod in 5-lb. coils. This rod, which is supplied in ⅛-in. and 3/16-in. diameters, makes it possible to execute



Coils of plastic bonded rod.

the Colmonoy Sprayweld process using wire metallizing equipment which will handle wires of these diameters.

Colmonoy plastic bonded rod is composed of powdered Colmonoy No. 6, combined with a plastic binder and extruded to the above sizes. As this rod passes through the flame of the metallizing gun, the plastic burns out, leaving the Colmonoy particles as a deposit on

the surface being sprayed.

After the desired amount of overlay has been applied (minimum of .010-in. to maximum of .125-in.) it is bonded to the base metal by means of a large oxygen acetylene torch, induction equipment or a controlled atmosphere furnace.

### Quick-Changing Hook

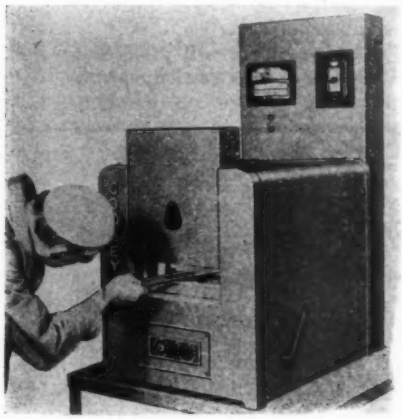
Designed for speed of attachment and maximum safety, a newly developed Clevis Hook has been added to the line of drop-forged wire rope and chain fittings, offered by the Thomas Laughlin Co., Portland, Me. The Clevis design, utilizing a bolt, slotted nut and cotter pin for fastening, makes it easy to attach the hook and switch from one job to another, yet meet all safety requirements. No welding, machining or threading is necessary to attach this hook.

The hook can be supplied with a safety latch, or with reversed jaw, on special order. It is made in four hook sizes, 1½, 2, 3, and 5 tons, and all parts, including bolts, are of drop-forged, heat-treated steel.

### Electric Furnace

An electric furnace capable of continuous operation at 2000 deg. F., and providing accurate temperature control down to 300 deg. F., is now being built by the Cooley Electric Mfg. Corp, Indianapolis, Ind.

Among other uses, the furnace can be



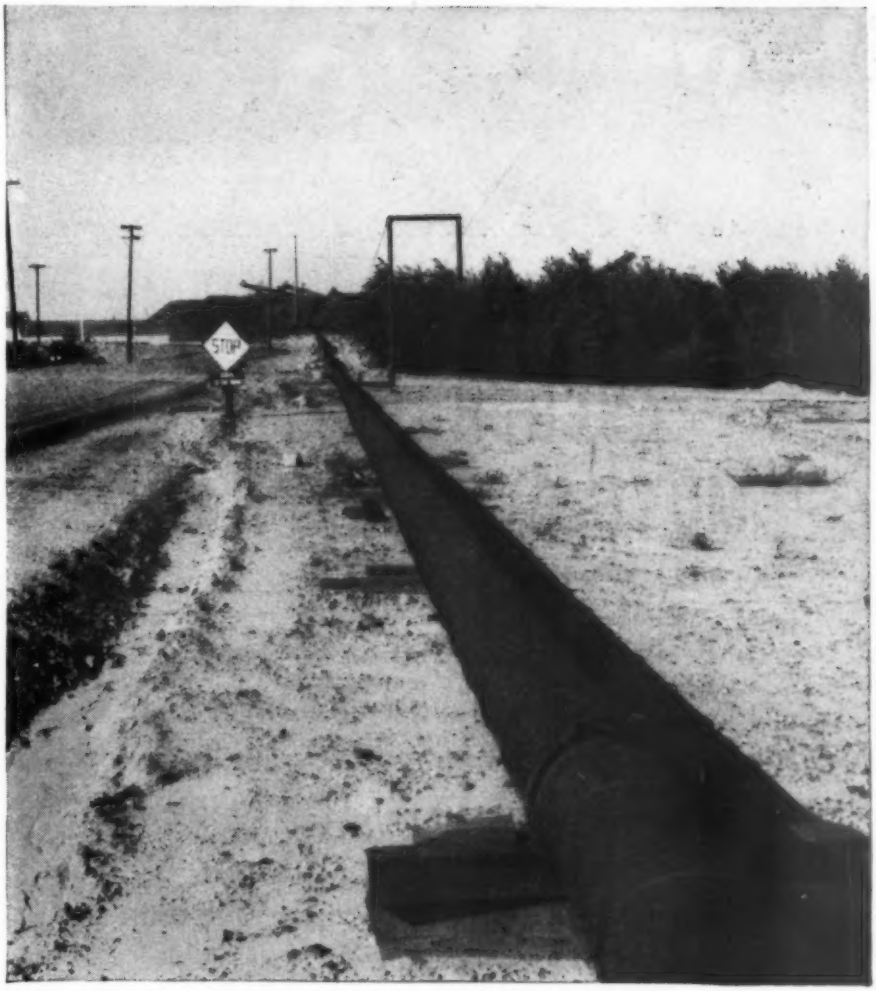
Useful for heating small parts.

used for the heat treating of small parts, tools, and dies. It can be heated from cold to 2000 deg. F. in 1½-hrs., and requires but half this time after an overnight shut-down. This rapid heating is facilitated by six embedded-type heating elements, including one in the door closing the 8 x 6 x 14-in. chamber. The furnace draws 20.2 amps. at 230 volts, and has a power capacity of 4650 volts.

The model VK-5 furnace, illustrated, is furnished with a counterweighted vertical lift door making it possible to conserve heat where small pieces are frequently removed.

**Drilling, blasting, crushing, screening, and electrification are only a few of the many subjects completely covered in the 24 chapters in the Pit and Quarry Handbook.**


# It's Naylor Light-weight Pipe




In mining service, Naylor is the one light-weight pipe with the strength and safety for high as well as low pressure service. Sizes from 4 to 30 inches in diameter with all types of fittings and connections.

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From job to job at *truck* speeds—one man operated.

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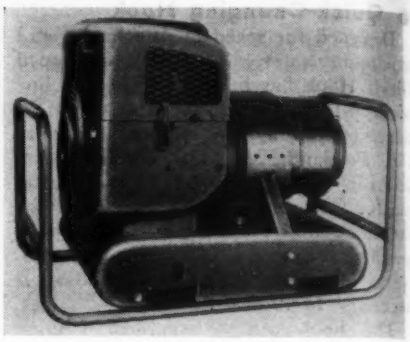
## ● Lightweight Electric Plant

A 5000-watt electric plant weighing only 272 pounds, known as the 5CK-115M, has been announced by D. W. Onan & Sons, Inc., Minneapolis, Minn. This model is one of a new, improved group of plants employing the new Onan



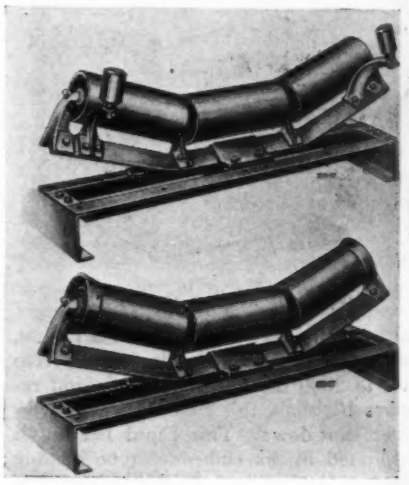
Light but powerful plant.

"CK" air-cooled, 4-cycle, 2-cylinder gasoline engine as a prime mover.

These units, designed for heavy-duty service, were developed to meet the increasing needs everywhere for lightweight, high-capacity independent sources of electric power.

The CK line of plants, according to Onan, is the result of many years of development on both engines and generators, aimed at reduction of weight per kilowatt, as well as greater compactness. The 5CK-115R weighs only 54.2 lbs. per thousand watts.

The new plants will produce about 1 kilowatt hour of electricity per quart of gasoline.



The Jeffrey Manufacturing Company, Columbus 16, O., has announced an improved type of self-aligning idler for belt conveyor service. Illustrated are the positive-type self-aligning idler (above) with guide rollers and (below) the self-aligning idler with flared, friction-type end pulleys particularly adaptable for reversible belts.

## ● Tractor Attachment

The Hystaway attachment for the "Caterpillar" track-type tractor is now available on a current delivery basis for the D8 Model. This unit, which combines a dragline, clamshell and crane with the mobility of a track-type tractor, has been extensively used on the D6 and D7 "Caterpillars" and has been released

Newly-released attachment.

for the larger D8 Model after more than a year of testing.

Specifications now call for a ½-cu.-yd. bucket on the D7 and D8 and a ⅜-cu.-yd. bucket on the D6. The basic Hystaway unit is now made for any of the three models with an attachment group for the specific model. Attachment groups are also made for fitting the unit to wide-gauge tractors and to those with additional attachments. Counterweight boxes are available for tractors used without bulldozers.

### • Sparkproof Cable

A new cable that will not spark when short-circuited has been developed by electrical engineers to aid in the prevention of explosions.

The new feature of the cable is a fine strand of copper wire embedded between the inner and outer layers of insulation. In the event of damage to the insulation, the fine wire catches incipient current leakage before an arc can occur and carries it to a sensitive circuit breaker which cuts off the power.

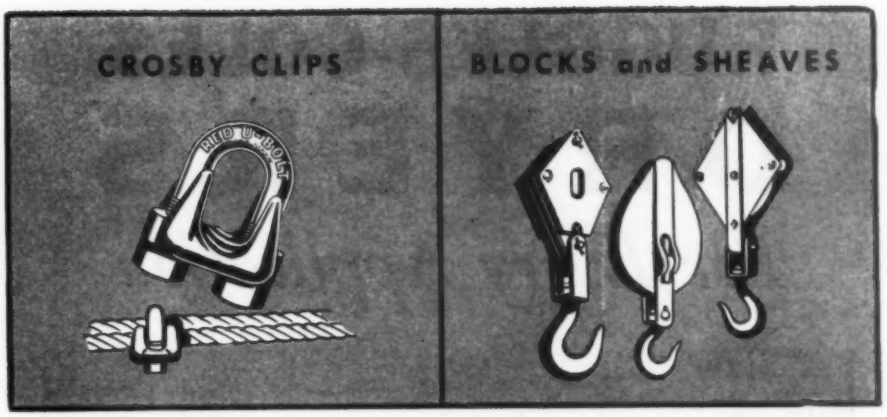
The cable was developed jointly by engineers of United States Rubber Company and Leonard Wilson of Kenilworth Mines of Utah. It is expected to eliminate a common danger in mines.

### • 2-Yard Dozer-Shovel

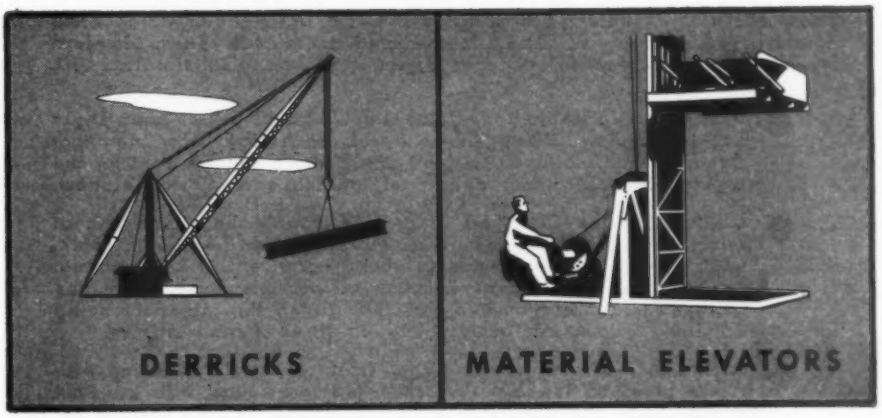
A powerful new 2-cu.-yd. bulldozer-shovel has just been announced by the Frank G. Hough Co. of Libertyville, Ill. Designed into the International TD-14 diesel tractor, the Model 14 bulldozer-shovel incorporates many new features.

A large capacity, front-mounted hydraulic pump, directly connected to the engine crankshaft, supplies power for all operations. By means of a single lever the operator can raise, lower, hold or "float" the bucket, or apply down pressure when hard digging is encountered. In addition, the bucket may be dumped partially or completely at any height and returned by hydraulic power.

An automatic bucket tip-back tilts the bucket back 38 degrees in carrying position to prevent spillage. The tracks are not tied down, but oscillate freely, to conform to ground contour, as in normal tractor operation. Front-end super-


In that 'phone book at your elbow, you'll find top-notch distributors who have CROSBY CLIPS, the HANDIWINCH, and AMERICAN BLOCKS AND SHEAVES on hand for immediate delivery. For fast, competent

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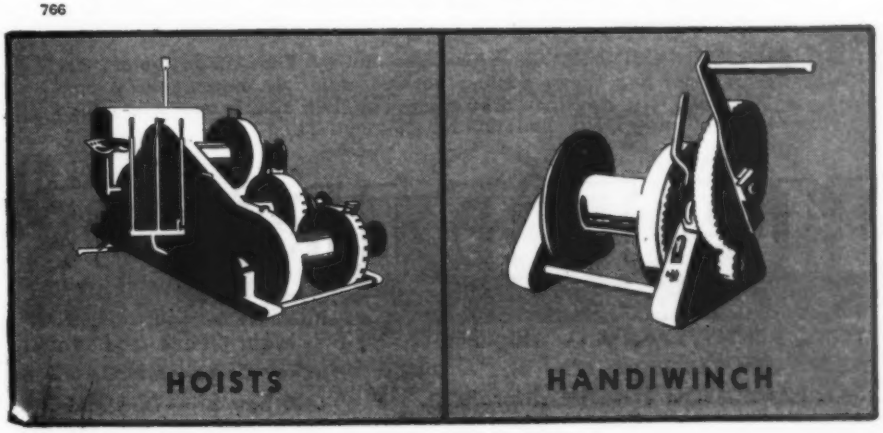

# RUGGLES-COLES DRYERS

## *For Every Application*

There are nine distinct types of Ruggles-Coles Double and Single-Shell Rotary Dryers, designed for direct, indirect and steam heat. These standard types can be modified for peculiar drying problems. Bulletin No. 16C.

- CLASS XA—The Ruggles-Coles Double-Shell, Direct-Heat Dryer has the highest thermal efficiency of any rotary dryer manufactured. It is the only direct heat dryer which can be used for the drying of coal without danger of ignition or explosion of dust.
- CLASS XB—The Class XB Dryer is a double-shell, indirect-heat rotary dryer designed to handle such materials as kaolin, chalk, whiting, china clay, pigments, fullers' earth, etc., which can not be dried by direct heat because of possible injury from the products of combustion. In this type dryer, the materials being dried never come into contact with the gases of combustion.
- CLASS XC—The Class XC Dryer is a rotary steam dryer with steam pipes on the inside of the shell that rotate with it. This is especially adaptable for drying materials that are injured by high temperature, such as brewers' grain, cotton seed, starch feed, tobacco stems, corn germs, etc.
- CLASS XF—The outstanding feature of the Class XF Dryer is its method of discharging the product. Unlike other types of single-shell dryers, the dried material is discharged outside the furnace. This increases the efficiency of the furnace, and prevents the flame from impinging against the dryer shell and warping or burning it out.
- CLASS XH—This is a single-shell, parallel flow Dryer, especially designed to handle oil flotation concentrates without sticking and without excessive dust loss. It has a high thermal efficiency and dries sticky material economically.
- CLASS XW—The Class XW Dryer is used almost exclusively for drying ammonium sulphate and similar materials. It is a single-shell dryer with steam coil heating element usually placed at discharge end of dryer.
- KILNS—COOLERS—Ruggles-Coles Rotary Kilns and Coolers are built for heating or cooling various materials under special conditions. The Keystone Kiln, a vertical shaft kiln, is specially suited for burning lime. Bulletins No. 16C and 23.

# HARDINGE

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NEW YORK 17—122 E. 42nd St. • 205 W. Wacker Drive—CHICAGO 6
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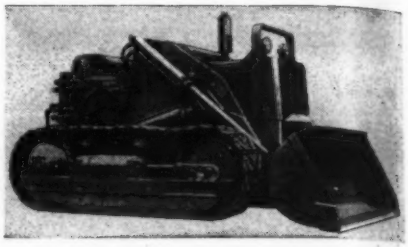


Has front-mounted pump.

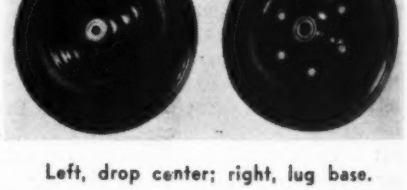
structures are entirely eliminated, providing the operator with complete visibility in every direction. The bucket extends the full track width of the tractor, to permit excavation close to walls, embankments and slopes.

A full track width bulldozer blade can be attached in a few minutes; thus the bulldozer-shovel can handle a wide variety of bulldozing jobs consistent with the size of the tractor. Hough bulldozer-shovels are also available in the 1-yd. size.

### ● Industrial Wheels

A complete line of industrial wheels for both high- and low-speed applications is now offered by the Gar-Bro Wheel Co. of 2416 E. 16th Street, Los Angeles, Calif. Available in a wide range of sizes, these wheels are especially suitable for materials-handling equipment. Both the drop center disc wheel and the lug base type are offered.

According to the manufacturer, the



Left, drop center; right, lug base.

wheel design has several advantages, including a bell-shaped disc which offers greater resistance to side thrust. The wheels are exceptionally light in weight, yet strong, and are able to stand six to eight times the allowed tire load.

The discs are stamped from cold rolled stamping steel. Heavy-duty wheels are equipped with Timken bearings. All wheels are enameled in glossy black and need no extra finish unless the user so desires.

The drop center disc wheel, of either the light-duty type for slow speed applications, or the heavy-duty type, is all-electric-welded into a solid unit. The lug base disc wheel is designed for cushion or single-tube tires and is suitable when puncture-proof operation is desired.

### ● Electrode for Fast Welding

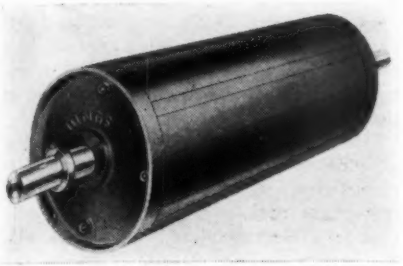
A new electrode, "Hobart No. 12," designed to increase welding speed on poor fit-up work, has been announced by Hobart Brothers Company, Troy, O. It is a heavy coated electrode designed for d.c. straight polarity or a.c. at higher current ratings.

At higher currents, the spatter loss of this electrode is unusually low and there is little tendency to stick when welding with a close arc.

This electrode is available in $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$ and $\frac{1}{4}$-in. diameters.

## • Magnetic Pulley

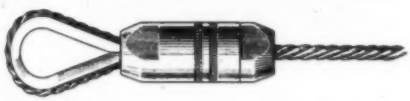
The "Perma-Pulley," a new permanent magnetic pulley with Alnico poles developed by the Dings Magnetic Separator Co., Milwaukee, Wis., is available in 53 sizes ranging from 12-in. diameter



Magnet for conveyor system.

by 12-in. width to 30-in. diameter by 60-in. width. Designed for use as head pulleys in a belt conveyor system or in a self-contained magnetic pulley-type separator unit, these magnets are used to remove magnetic substances automatically from nonmagnetic materials carried on the belt.

The Perma-Pulley has a crown face to prevent belt weaving and to aid in even distribution of the burden across the belt as it passes over the pulley. Shaft diameters are standard to permit replacement of nonmagnetic head pulleys in existing installations without changing bearings or shaft mountings. Head plates of the pulley are nonmagnetic to prevent collection of magnetic material on the outside edges. A narrow gap design is used with nonmagnetic gap plates between the poles and equal magnetic strength across the full width of the belt.



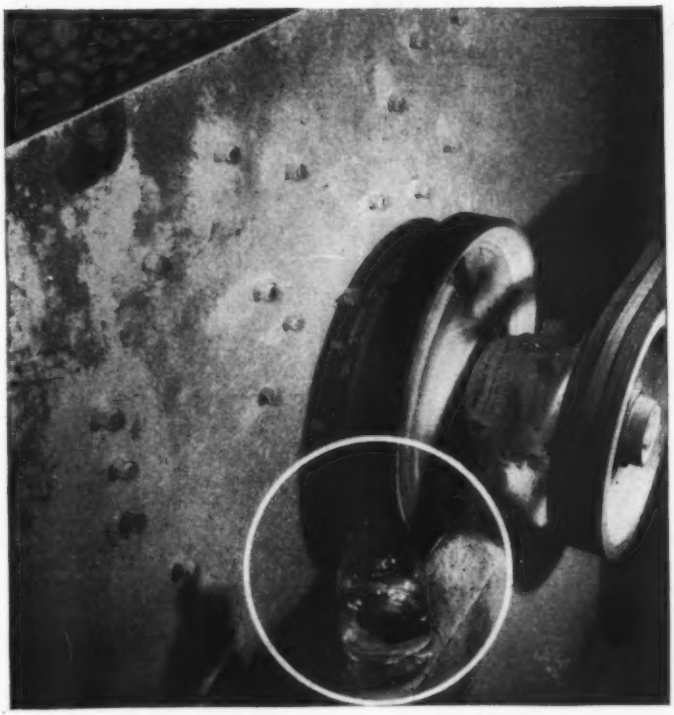
Cabl-Ox is a wire rope clamp which increases its grip upon the rope as the pull increases. It is manufactured by Cabl-Ox Corporation, 6 N. Michigan Avenue, Chicago, Ill., which owns exclusive rights to the clamp, as well as to Cabl-Vise and allied wire rope products.

## • New Tire Sizes

Production of two new sizes of truck tires is announced by The B. F. Goodrich Company. They are the 7.50x20 (10-ply) "Universal," and the 14.00x24 (20-ply) "Rock Quarry" casing.

The Universal tire is widely used for operating small trucks and in quarry and gravel pits, as well as for shuttle cars in underground mines. The Rock Quarry casing has a smooth tread, and is specially designed for quarry operators and various mining uses where cutting has been a problem.

No Rocking-No Bobbing



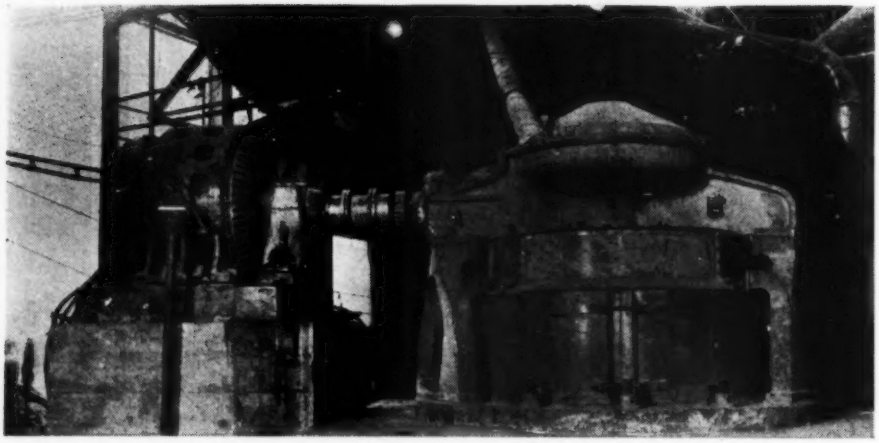
. . . with a SECO vibrating screen

Smooth! That's the word to describe the true circular motion of a Seco vibrating screen. Yes, sir, and that's the big reason why operators everywhere screen more tons per hour with Seco vibrating screens. There's no wasted motion . . . no weaving from side to side . . . no stormy sessions with supporting structures, thanks to Seco's patented equalizer assembly. Put a Seco to the test! And you'll be a happy "skipper" with better production at lower cost. Write today for "A Guide to Better Screening." Dept. A.

TRUE CIRCULAR MOTION VIBRATING SCREENS

SECO

SCREEN EQUIPMENT COMPANY, INC.
BUFFALO 21, NEW YORK
In Canada: United Steel Corp., Ltd., Toronto



Pulverizer of many uses.

## ● All-Purpose Pulverizer

The "Hercules" mill, built by the Bradley Pulverizer Company of Allentown, Pa., has been used as a preliminary machine in the portland cement industry since 1912. Since then many manufacturers have adopted Hercules mills as grinders of dry raw mix and particularly for grinding clinker where the unit is used as a preliminary pulverizer for the finishing tube mill. (See illustration.)

The material is fed through the casing and screen, thus eliminating all feed spouts and hoppers and reducing maintenance costs. The driving pinion, 2 bearings and pinion shaft are contained in a cartridge which can be removed in a short time for replacement without disturbing the alignment of any part of the machine.

The Hercules mill is also regarded as an efficient and economical machine for pulverizing agricultural limestone and phosphate rock.

A new Hercules has been in operation at the plant of the Coplay Cement Company, Coplay, Pa., for some time. It has met routine tests and is now in production for delivery, beginning January, 1948. The mill is lower than any other Hercules model, and on account of the low center of gravity, vibration is reduced to the minimum. It is quiet in operation, and uses long-life, quiet spiral-bevel gears which run in an oil bath.

## ● Portable Crusher

Production of a self-contained portable crushing unit, the 22-inch packaged series of Symons cone crushers, is announced by Nordberg Manufacturing Co., Milwaukee 7, Wis. This unit consists essentially of a 22-in. Symons Cone Crusher, motor and drive, mounted on a welded-steel supporting base and skid.

Self-contained traveling crusher.

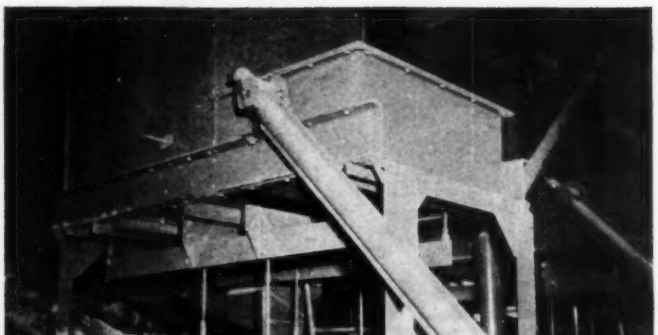
The unit can be readily transported without disassembling drive and piping or draining oil from the pressure lubrication system. It can be furnished with electric motor or with diesel or gasoline engine drive.

This new crushing unit is especially applicable to stationary plant operation as a compact, self-contained, secondary reduction unit.

The discharged product can be drawn off on a belt conveyor or bucket elevator from any one of three sides of the unit. Capacity of the crusher varies from 20 t.p.h. at ⅜-in. setting to 60 t.p.h. at about 1½-in. setting.

The electric-driven unit is furnished with a 25-hp. 1200 r.p.m. motor (for 60 cycle service), starter with push-button station, V-rope drive and safety guard.


THE WORLD'S FINEST $3,000,000 Roofing Granules Plant at Little Rock



Equipped with MERRICK WEIGHTOMETERS for...Controlling Quality Production

The Star Installation of the year is undoubtedly the superbly equipped new plant of the Minnesota Mining and Manufacturing Company at Little Rock, Ark.

Here the latest type of automatic equipment is employed to insure modern, high-efficiency production of syenite rock roofing granules at an annual output of 300,000 tons of finished product.

MERRICK Weightometers are located at strategic points throughout the plant in the crushing, screening, coloring and storage divisions.

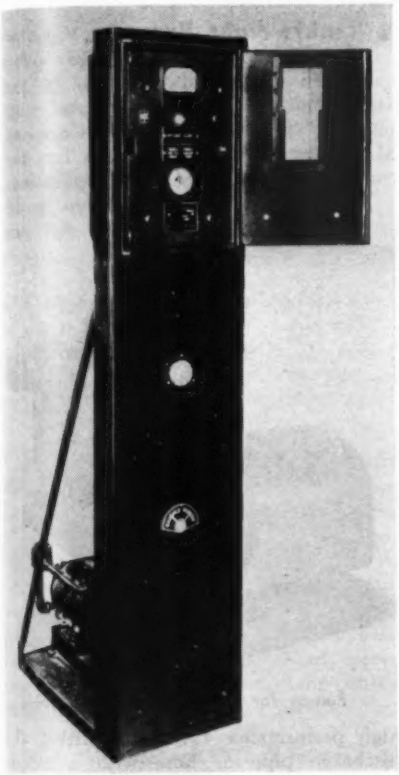
"MERRICK is a mark of modern methods".

MERRICK SCALE MFG. CO. 188 AUTUMN STREET PASSAIC, NEW JERSEY

## ● Gas Detection System

Davis Emergency Equipment Company, Inc., 45 Halleck Street, Newark 4, New Jersey, manufacturers of gas detection equipment announces new and outstanding developments in their continuous, combustible gas alarm system (remote-head type).

The system was designed to detect the



Gas alarm meter.

presence of combustible vapor and/or gas and to give an audible signal before the mixture becomes dangerous. The Davis gas alarm system's basic principle is the effect of combustion of flammable gas-air or vapor-air mixtures on a heated filament in the analyzer head, located in the area to be sampled. The combustion raises the temperature and the electrical resistance of the filament and part of the current is diverted through a meter, calibrated in terms of the lower explosive limit of the gas or vapor being detected. In this way analyses are made under actual temperature conditions at the points where dangerous gases or vapor-air mixtures exist.

When these mixtures reach a preselected percentage of the lower explosive limit, a series of relays close and sound an audible signal.

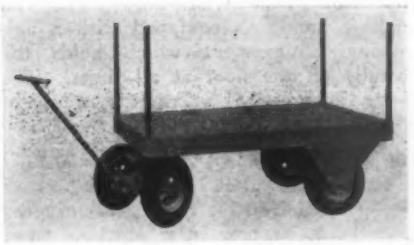
The Davis alarm system is built on the unit system. When a number of sampling points are required, several control cabinets are used, each having its own analyzer head, but all are served by the same pump.

The meter, on each cabinet, calibrated for the specific gas or vapor on which the system is designed to operate, indicates the lower explosive limit of the gas or vapor. The rate of climb of the meter's needle indicates the rate of increase of gas concentration, thus providing a measure of the seriousness of the leak. The rate of fall of the needle indicates how rapidly the area is being cleared of gas.

## ● Indoor-Outdoor Truck

The Market Forge Company, 25 Garvey Street, Everett, Mass., has just announced the addition of a new standardized truck, to be added to its line of load-carriers.

This truck will be found desirable for plants which require trucks to be handled both indoors and outdoors, and where quietness of operation, cushioning of load or unsatisfactory floors make this type unit desirable. The truck can be furnished with suitable devices for hauling by tractor, truck or auto. The truck has



All-steel construction.

a rated capacity of 2500 lbs. The height of the truck above the floor is 22 inches. It is 30 inches wide and 60 inches long. It is furnished with four 16-in. diameter pneumatic wheels.

The truck is of the wagon type, and

Ahead are months of rain, snow, ice and frigid temperature . . . months when you need a conveyor belt that can meet the weather on its own terms and win.

When the elements are giving equipment a beating and the demand for materials is on the increase . . . be prepared with Cincinnati Conveyor Belts on the job . . . know that you have the toughest, hardest working belts, regardless of weather, that money can buy.

**THE CINCINNATI RUBBER MFG. CO.**
**Cincinnati 12, Ohio**

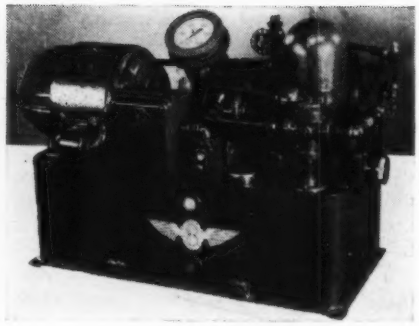
**CINCINNATI CONVEYOR BELTS**

the front axle is self-adjusting. The pulling handle is equipped with a balancing arrangement which holds the handle off the floor at all times. The truck is ruggedly constructed entirely of steel.

## ● Power Pack

Greer Hydraulics, Inc., 454 Eighteenth Street, Brooklyn 15, N. Y., recently designed and is now in production on a new self-contained hydraulic power pack, Model PP-113. This unit supplies hydraulic power and automatically maintains a steady uniform pressure.

This power pack is completely self-contained and is furnished ready for use. It is necessary only to couple the pressure and return lines in the plant directly to the pressure and return connections in the machine. The unit is equipped with a reservoir, a suitable electric motor and pump, an overload cutout magnetic starter and push-button switch, a relief valve which has an automatic pump unloader, a relay valve, a hydraulic accumulator, a pressure gauge and related manifolds and control valves. This power pack is especially designed to eliminate the need for large weight accumulators, cumbersome pumps and motors, and intricate manifolds and valves.



Easily-installed power unit.

## ● Lightweight Pump

The Gorman-Rupp mine spray pump has been developed for use in and around mines, pits, quarries and stock piles by the Gorman-Rupp Company, Mansfield, O. It is valuable for dust control and has many other applications.

The versatility of the pump is increased by its light weight, 27 lbs., and high performance ratio. By fitting the discharge pipe or hose with a nozzle an almost endless variety of sprays can be obtained. The pump will lift water up to 25 feet and deliver 8 g.p.m. at 40 lbs. pressure. It is powered by a Lamb Electric ½ hp. Universal type electric motor, 110/115 volts a.c. of 60 cycles or less or d.c.

Pumps for mines, pits, quarries.

Gorman-Rupp's patented self-priming design facilitates quick performance. There is only one moving part, the impeller, which can be removed by unskilled labor for servicing.

## ● All-Position Electrode

The improved Wilson No. 512 all-position, mild steel electrode is designed to produce weld metal possessing excellent mechanical properties and low hydrogen content. It is offered by the Wilson Welders and Metals Company, Inc., 60 E. 42nd Street, New York, N. Y.

This electrode has two advantages over its predecessor in that it can now be used on a.-c. and d.-c. reverse-polarity current with the operating characteristics being equal. The former 512 electrode could be used only on d.-c. reverse. Preheating of this electrode is no longer required for porosity-free deposits.

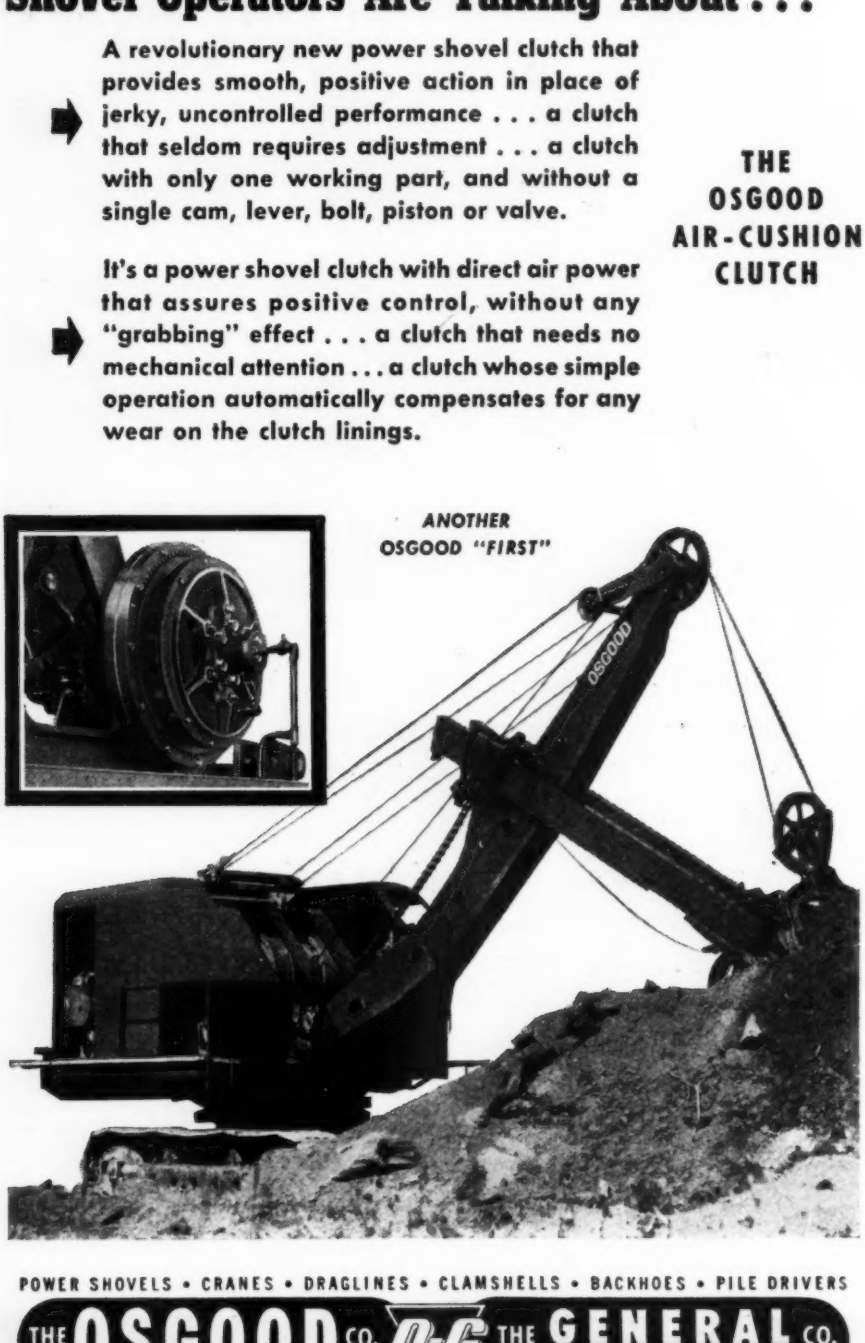
Recommended application for the improved Wilson 512 are as follows: welding high-sulphur, free-machining steels; welding hardenable steels where no preheat is used; welding cold rolled steels which normally exhibit excessive porosity when welded with conventional electrodes; weldments to be vitreous enameled after welding.


**Shovel Operators Are Talking About . . .**

**A revolutionary new power shovel clutch that provides smooth, positive action in place of jerky, uncontrolled performance . . . a clutch that seldom requires adjustment . . . a clutch with only one working part, and without a single cam, lever, bolt, piston or valve.**

**It's a power shovel clutch with direct air power that assures positive control, without any "grabbing" effect . . . a clutch that needs no mechanical attention . . . a clutch whose simple operation automatically compensates for any wear on the clutch linings.**

**THE OSGOOD AIR-CUSHION CLUTCH**




POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. O-G THE GENERAL CO. EXCAVATOR

MARION OHIO

DIESEL, GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

# TRADE NOTES

Felix Sweeney

Felix W. Sweeney has been appointed assistant sales manager of Wayne Crane Division of American Steel Dredge Company, Inc., according to an announcement made by Walter W. Walb, president of the company.

Mr. Sweeney will conduct sales clinics in the Western territories, while Don L. Douglass, sales manager, will cover the Eastern states.

D. A. Cheyette, who was recently made a vice-president of the Nordberg Manufacturing Company of Milwaukee, Wis., recently spent several weeks touring Iceland, Belgium, Holland, France, Germany, Switzerland, Italy, Norway, Sweden, England and Scotland. During this trip he visited cement and lime plants, quarries, gravel operations, mines and mills and also inspected plants which manufacture the equipment for these industries.

While in England, Mr. Cheyette attended a conference of the Institute of Quarrying at Scarborough.

F. G. Hoyt

To coordinate the recently-announced program of modernization and expansion of production facilities in the Woven Wire Fabrics Division, John A. Roebling's Sons Company, through its president, Charles R. Tyson, announces the appointment of F. G. Hoyt as general manager.

Mr. Hoyt will be assisted in his new capacity by J. Fennell Berger, assistant manager of sales, and F. Clifford Peet, superintendent of production.

A. G. Bussmann, a vice-president of the Wickwire Spencer Steel Division of the Colorado Fuel and Iron Corporation, died on October 7 at Bronxville, N. Y., at the age of 61.

Mr. Bussmann was successively manager of the wire and spring departments, sales manager of the Buffalo district, assistant to the president and general sales manager. At the time of his death he was in charge of sales for the Wickwire Division. He was the father of Charles Bussmann, central advertising manager for PIT AND QUARRY in Cleveland, O.

The thirtieth anniversary of The Dorr Company's acquisition of the Westport mill and its research and testing plant at Westport, Conn., was celebrated on September 6 at a birthday party at the plant, attended by some 250 members of the staff, their families and professional friends of the company. John V. N. Dorr acted as host and presided at the cutting of two huge birthday cakes.

The original mill, purchased in 1917, was a frame and shingle grist mill, built shortly after the Revolution. In 1937, after a fire, it was completely rebuilt as a modern laboratory. In 1944, a semi-works plant was added. Research and process engineering is done here for the company and for its industrial clients.

The appointments of Roger G. DeLong as manager and of W. B. Gibson as sales manager of the Hydraulic Division of the Twin Disc Clutch Company, Racine, Wis., have been announced.

R. G. DeLong

W. B. Gibson

Mr. DeLong has been serving as both


We're still getting new customers for TDA*

*Thanks to our old customers who have spread the word that* **TDA***

1. Reduces grinding costs (including power)
2. Increases production rate
3. Gives a better balance between kilns and mills
4. Makes it possible to meet the current high demand for cement without capital expenditure

*T. M. REG. U. S. PAT. OFF.

THE CATALYST DISPERSIVE AND GRINDING AID — TDA

A PRODUCT OF
DEWEY AND ALMY CHEMICAL COMPANY
CHICAGO, ILL. CAMBRIDGE, MASS. OAKLAND, CAL.

**With Cleveland Wire Screen Section Assemblies**

- Increase your profits and stop tonnage losses with the specially prepared, reinforced screen sections for vibrators. This standard type of edge is available in five different styles for electrical and mechanical vibrating machines.

Let our wire screen specialist show you how you can adapt these screen section assemblies to increase your profits.

**There is a CLEVELAND Wire Screen for every purpose.**

- NO PULL-OUT
- NO SAG
- LONGER SCREEN LIFE
- EXTRA STRENGTH
- EASY TO CHANGE
- DRUM-TIGHT TENSION

**For detailed information on Cleveland Screen Section Assemblies write today for BULLETIN No. 6.**

THE CLEVELAND WIRE CLOTH & MFG. CO.
3574 E. 78 STREET CLEVELAND 5, OHIO



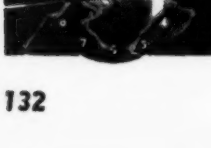
*This* HEAVY-DUTY
**WISCONSIN**
*Air-Cooled* Engine
IS AVAILABLE IN 4 SIZES . . . 4 TO 9 H. P.

**Illustrated above is the Models AEH to AHH series of 4-cycle single cylinder Wisconsin Air-Cooled Standard Engines, to which the following specifications apply:**

| MODEL | AEH | AFH | AGH | AHH |
|---|---|---|---|---|
| Bore | 3" | 3¼" | 3½" | 3⅝" |
| Stroke | 3¼" | 4" | 4" | 4" |
| Cu. in Displ. | 23 | 33.2 | 38.5 | 41.3 |
| Hp. Range | 4-6 | 5-7 | 6-8.5 | 7-9 |
| Weight | 130 lbs. | 180 lbs. | 180 lbs. | 180 lbs. |

**If your equipment calls for an engine within the above power range, it will pay you to give serious consideration to the Wisconsin line . . . noted for rugged, heavy-duty serviceability and thorough-going dependability.**

**In addition to the engines listed above Wisconsin 4-cycle single cylinder engines are also available in 2 to 4 hp. sizes, and V-type 4-cylinder engines can be supplied in a power range of 13 to 30 hp. Detailed data furnished on request.**




**WISCONSIN MOTOR CORPORATION**
*World's Largest Builders of Heavy-Duty Air-Cooled Engines*
MILWAUKEE 14, WISCONSIN

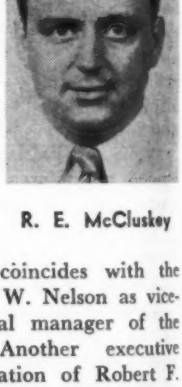

acting manager and sales manager of the Rockford Division. Mr. Gibson has been assistant district manager of the Eastern Territory.

Albert Musschoot

Albert Musschoot, a member of the general engineering staff of Link-Belt Company at Philadelphia, has been appointed assistant to the chief engineer, with headquarters at the company's general office, 307 N. Michigan Ave., Chicago.

In this capacity, he will be directly responsible to Richard F. Bergmann, Link-Belt vice-president and chief engineer.

A. Harold Smith has been named New York district sales manager and P. H. Potts is the new branch manager of New York for the Quaker Rubber Corporation of Philadelphia, Pa.



R. E. McCluskey

Roy E. McCluskey, formerly assistant treasurer of R. G. LeTourneau, Inc., has been made vice-president in charge of sales.

Mr. McCluskey in his new position will direct the company's sales divisions, as well as other related departments.

His appointment coincides with the resignation of Oscar W. Nelson as vice-president and general manager of the Peoria Division. Another executive change is the resignation of Robert F. Nelson as vice-president and assistant to the president. Mr. Robert Nelson is continuing his affiliation with the LeTourneau interests as a member of the board of directors.

G. D. Fraunfelder

George D. Fraunfelder, formerly chief sales engineer of Easton Car & Construction Company, Easton, Pa., has been appointed to the newly-created office of director of engineering and research.

Mr. Fraunfelder has been with Easton as a design engineer since 1926. For several years his work has been concentrated on the development of heavy-duty off-highway trailers for mines, quarries and intra-plant industrial haulage. He is also largely responsible for the design of several modern large-capacity truck bodies and cars for similar service.

Now in its 25th anniversary year, the Hammond Bag and Paper Company, Wellsburg, W. Va., announces the leasing of a plant at Pine Bluff, Ark., to be used exclusively for the manufacture of "Multi-Wall" paper bags. These bags are used extensively for shipping cement, lime, plaster, rock products, chemicals, pigments, flour, rock wool insulation, etc.

Allen E. Weaver, who has been with the company at the Wellsburg plant for 14 years, will be the production manager at the new Pine Bluff Plant.

R. Chelminski

Roman Chelminski, who was for many years associated with The Dorr Company and more recently with the Process Division of General American Transportation Corporation, has joined Knowles Associates, an engineering and consulting organization at 19 Rector Street, New York 6, N. Y., as a general partner.

Mr. Chelminski has had extensive experience in machine design, ore beneficiation and metallurgical concentration.

Andrew Edward Johnson, mechanical superintendent of the Westport mill, laboratories and testing plant of The Dorr Company at Westport, Conn., died on August 15, in his 69th year. He had been associated with John Van Nostrand Dorr since 1903.

J. I. Miller, president of Cummins Engine Company, Inc., Columbus, Ind., announces the following action by the board of directors:

R. E. Huthsteiner, vice-president and general manager, was elected a director of the company, to succeed Hugh T. Miller, who died on May 26, 1947.

Edwin G. Crouch was elected secretary, to succeed D. C. Bottorff who died on June 3, 1947.

Waldo M. Harrison was elected treasurer, to succeed Mr. Bottorff. Mr. Harrison also will continue as controller.

The resignation of H. L. Knudsen as vice-president of engineering was accepted with regret. Mr. Knudsen has been associated with the company and its predecessors for more than 25 years. He will continue as a director of the company, and also will serve as engineering consultant on problems of design and research.

At the meeting of the directors of Associated Equipment Distributors, held recently in Chicago, it was decided to move the A.E.D. executive offices to Chicago. The association's address will be 360 N. Michigan Avenue, Chicago 1, Ill. Changes in the personnel of the associations officers include the resignation of Carol Winchester as executive secretary and the appointment of Frank G. Knight, formerly assistant secretary, to fill this vacancy.


"ROCKBIT" can do this for you, too

←BEFORE

What a difference "ROCKBIT" makes in these crusher plates!

AFTER→

Let "ROCKBIT" restore your crushing equipment to its original peak capacity of performance

ADVANTAGES OF "ROCKBIT" REBUILDING

1 Guaranteed to give the equivalent or better life than new crusher jaws.
2 Under a new and exclusive process of welding, crusher jaws are returned without the usual warpage.
3 Guaranteed against any excessive warpage.
4 Time saving
5 Money saving

Write for Information

ROCKBIT SALES AND SERVICE CO.

350 DEPOT STREET
ASHEVILLE, N. C.

Investigate

this MODERN Core-Drilling Machine

It's Engineered to Meet Your Most Severe Demands

Sprague & Henwood Core Drilling Machines are modern in every respect . . . can EASILY perform the work expected of them! That's because they are built to meet the demands of present day core drilling work! The machines are high speed, of exceptionally sturdy construction to withstand rugged service. Available with two distinct types of feeds, "Screwfeed" and "Hydraulic," according to the type of swivel head selected. Have many exclusive features. Write today for full details.

ALSO DRILLING CONTRACTORS

Bortz DIAMOND BITS are also manufactured by Sprague & Henwood. Full details sent upon request.

SPRAGUE & HENWOOD, Inc.

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Two new appointments to West Coast sales positions were announced recently by V. C. Genn, general sales manager of the Detroit Diesel Engine Division, General Motors Corporation.

L. H. Wells

V. Hansen

Lauren H. Wells has been assigned as sales engineer for the northern West Coast zone and will direct industrial, marine and petroleum distributors sales in that area. His territory will include Washington, Oregon and the northern part of Idaho.

Victor Hansen will take over the southern West Coast zone in a similar capacity, distributors in California, Arizona, and eastern Nevada coming under his jurisdiction.

These appointments were made to fill vacancies left by Murrison C. Wright and James R. Williams, who, as of August 1, take over the northern California distributorship franchise for the sale of General Motors Series 71 Marine and Industrial Diesel engines.

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GEORGE HAISS MANUFACTURING COMPANY, INC.
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HAISS
PORTABLE CONVEYORS • SNOW LOADERS • CLAMSHELL BUCKETS

E. D. Wallace

Gar Wood Industries, Inc., has named E. D. Wallace sales manager of its Buckeye Traction Ditcher Division at Findlay, O. Mr. Wallace has had 20 years' experience with heavy construction equipment, the last ten of which have been with Buckeye as a district representative.

W. C. Petersen is appointed service manager of the Buckeye Traction Ditcher Division at Findlay.

W. E. Dawson and W. R. Steenrod, formerly district representatives for Buckeye, have been appointed district managers.

Contract for construction of International Harvester Company's new motor truck sales and service branch in Milwaukee has been awarded the Permanent Construction Company of Chicago.

Construction of the new branch will begin immediately on a 7½-acre site acquired some time ago by Harvester. The new building will contain 43,000 square feet of space and will cost more than $350,000.

Royce A. Hill

Royce A. Hill was recently named field sales engineer for the northern section of the Dallas region of General Motors Detroit Diesel Engine Division.

Since joining the Detroit Diesel organization in October, 1944, Mr. Hill has served in various sales capacities including assistant to the overseas sales manager, which post he has held for the last several months.

The St. Regis Paper Company of New York and its consolidated subsidiaries report sales for the first six months of 1947 of $69,033,514, as compared with sales of $35,336,923 during the same period last year. Net earnings after taxes for the first half of this year amounted to $7,696,147, as compared with net earnings of $5,563,603 for the entire year 1946.

St. Regis now operates 43 plants and mills in the United States and three in Canada and owns or controls 1,442,140 acres of pine, spruce and balsam stands sufficient in the estimation of experienced woodmen for 6,000,000 cords of pulpwood.

H. M. Hammond, vice-president of the Bailey Meter Co., has announced that the last members of the 1946-47 cadet engineering class have been assigned to the company's branch offices. J. H. Wilson reported to Cincinnati early

in August and R. W. May to New York early in September.

Another training course started July 18 with fifteen graduate engineers and one engineering student attending. This course, which lasts approximately six months, will give these engineers a firm groundwork in instrumentation and automatic control as it is applied to power plants and industrial processes.

C. E. Nelson Jr.

Chas. E. Nelson Jr. has been appointed special assistant to President J. E. DeLong of the Waukesha Motor Co., Waukesha, Wis. Mr. Nelson entered the Waukesha Motor organization in 1929. Since June, 1936, he has been director of purchases and production planning. His new duties will be in addition to his past responsibilities, which he will continue to discharge.

The following appointments have been announced by the Twin Disc Clutch Company of Racine, Wis.:

C. F. Mohrbacher is now assistant sales manager of the Racine Division; A. E. Young is district manager of the West Coast territory, including California; E. H. Bennett is district manager of the Eastern territory, with headquarters in Newark, N. J.; J. B. Jenkins heads the Michigan territory, with offices in Detroit; P. G. Tyrrell is assistant district manager served by the new Los Angeles office; P. W. Wahler, formerly of New Orleans, is now assistant district manager at the Seattle factory branch; Wade Eskridge is assistant district manager in the mid-continent territory, and is in charge of the Tulsa office; and H. A. Davis, manager of this territory, has shifted his headquarters from Tulsa to Dallas.

Bernard E. Gray, general manager of The Asphalt Institute, has announced the appointment of Herbert Spencer as the institute's district engineer for New York and New Jersey, to provide more intensive engineering coverage in the metropolitan area. Mr. Spencer continues as secretary of the institute.

Factory service schools developed by manufacturers during the World War II upon request of the Armed Forces, are today providing free detailed training for members of dealer sales and service organizations in many branches of the construction industry.

Early in 1943 the United States Army Ordnance Training office petitioned the Allis-Chalmers Tractor Division to establish a tractor service school which would familiarize military personnel with main-


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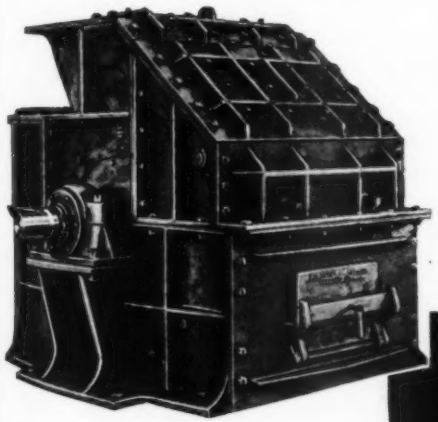

Meeting seasonal requirements with stockpiles balanced to your needs is easy with an American "ACS" Hammermill. This high capacity, heavy-duty crusher with individual size control assures a uniform run of desired sizes from roadstone coarseness to agstone fineness in the same run with accurately governed ratios.

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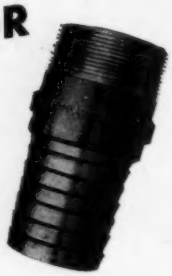

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tenance and service techniques of the M-4 and M-6 prime movers. Army instructors cooperated with company representatives and a three-week training course was set up at Allis-Chalmers' Springfield, Ill., plant, where hundreds of soldiers soon became mechanically acquainted with 18- and 36-ton A-C military tractors.

When the army plan was concluded at Allis-Chalmers in May, 1945, the company decided to continue the school for the benefit of sales and service personnel. Each dealer is now invited to send his men to either a five-day sales school or a two-week course for mechanics. These courses are run alternately throughout the year. Sales personnel receive information regarding latest developments of company and allied equipment as well as a refresher on existing products. Service attendants are provided with a training that enables them to do their job more easily, efficiently and quickly.


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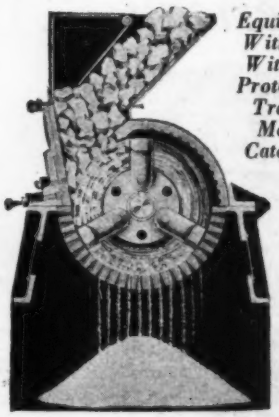

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# Legal Decisions

By LEO T. PARKER
Attorney at Law

## Lease Expired

Frequently lessors continue to occupy land after expiration of the lease and extract rock, sand and gravel and other nonmetallic products. It is important to know that the property owner may recover damages based on the profits earned by the lessor.

For instance, in *Del v. Bussen,* 179 S. W. (2d) 744, the owner of land leased it to a rock company for five years. The lease contract stated that the rock company should pay the land owner six cents per cubic yard for all stone quarried during the term of the lease.

Legal controversy developed when the rock company continued to occupy the land after the lease contract terminated.

The lower court awarded the property owner damages based upon the profits the quarry company would earn from the quarried rock.

Other courts have held that the land owner may recover damages based on the reasonable rental value of the land.

## Company Forfeits Land

It is well established law that a riparian owner on a running stream has *at all times* the right to *reasonably* use the waters of the stream. On the other hand, the state has the right to demand that the natural banks of a navigable stream be preserved, so as to maintain the natural course of the stream.

According to a higher court decision, a land owner who causes water from a stream to *permanently* cover his land thereby forfeits legal title to his land to the state.

For example, in *State v. R. E. James Gravel Company,* 175 S. W. (2d) 739, it was shown that a company excavated large quantities of gravel from their property adjacent a navigable river. This created a large pond, and the river broke through its bank into the pond.

In subsequent litigation the higher court held that the gravel company lost forever the title to the land covered by water. This court said:

"Where the riparian owner has infringed that right, the necessary consequence of which is to obliterate the old bank of the river and create a new bank, his title to the new bed so created is thereby divested."

## Officials Negligent

Modern higher courts hold that all employers who permit employees to work in dangerous locations *always* are liable in damages for resultant injuries to such employees.

For illustration, in *City of Denton v. White,* 179 S. W. (2d) 834, it was shown that the superintendent of a gravel corporation instructed a laborer to dig gravel from a pit. The wall of the pit caved in, completely burying the laborer, who received serious injuries. He sued the corporation for damages.

During the trial the laborer proved that the weather had been cold and rainy immediately prior to the injury and that the cause of the caver-in was the freezing and melting of snow and ice in a crack in the wall of the pit.

The jury granted the laborer heavy damages on the ground that the corporation officials were negligent in failing to warn him of the danger resulting from the crack near the top of the wall. The higher court approved the verdict, and said

"We believe that the jury were warranted in concluding that Coffey (superintendent) in the exercise of ordinary care, should have made an inspection or had it done before sending his men into the pit."

## Foreman Causes Injury

Generally speaking, an employer is liable in damages where a foreman while acting within the scope of his employment negligently causes an injury to another employee or other person lawfully on the premises.

For illustration, in *Daugherty v. Spuck,* 175 S. W. (2d) 45, it was shown that a foreman at a corporation's plant requested a truck driver to assist him. While so assisting a heavy metal casting was dropped thereby inflicting severe and permanent injuries to the

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truck driver. The latter sued the corporation to recover damages for the injury. The higher court held the corporation liable for $1,750 damages.

On the other hand, readers should realize that if the truck driver had been requested to assist in the loading by a person who had *no* authority to direct in the loading, the corporation would not have been held liable.

### Lease Held Prior

According to a recent higher court a landlord's lien for delinquent rent payments is prior to liens for money due on merchandise sold to the tenant.

For illustration, in *Pollock Company v. Crosby,* 16 So. (2d) 611, it was shown that a seller sold certain building materials to a tenant who failed to pay the bill. The seller sued the tenant and secured a judgment against him for the sum of $295.41. However, the tenant owed the owner of the premises on which the business was operated $150 back rent.

The court granted the landlord first lien on the tenant's assets, whereby the seller lost the amount due for materials previously sold and delivered to the tenant.

### Broker Sues for Commission

According to a recent higher court a contract is valid whereby a real estate broker agrees to collect his commissions from either a lessor or lessee.

For illustration, in *Doll v. Albert Weiblen Marble and Granite Company,* 17 So. (2d) 313, a real estate broker sued the Albert Weiblen Marble and Granite Company to recover legal commissions for obtaining a 10-year lease on property for use in the company's business. The lower court held in favor of the broker and awarded him $600 commissions.

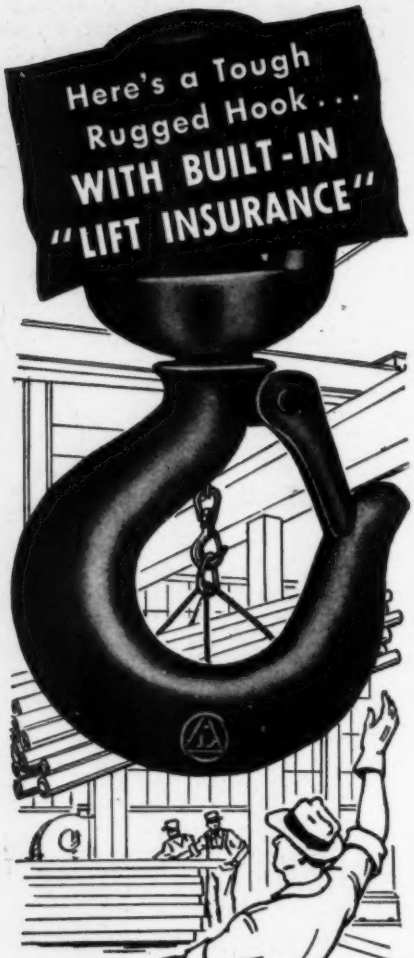
The company appealed to the higher court and proved by witnesses that the broker had agreed to collect his commissions from the lessor, or owner of the land.

Therefore, the higher court reversed the lower court and held the company not liable for payment of the commissions saying that a real estate broker may legally agree to collect his commissions from either a lessor or lessee, buyer or seller of real property.

### Mineral Rights

In *Kernkamp v. Wellsville,* 170 S. W. (2d) 692, the testimony showed facts, as follows: The taxes assessed for several years on certain land became delinquent. The land was advertised for sale and sold for these taxes. A company began mining and hauling materials from the land. The legal question presented the court was whether the company was liable to the new purchaser for payment of the materials removed from the premises after the tax sale.

The evidence proved that the land had been carried on the tax records as *having separate values* for the surface and subsurface rights. Therefore, the higher court held that the purchaser of the tax deed did not acquire owner-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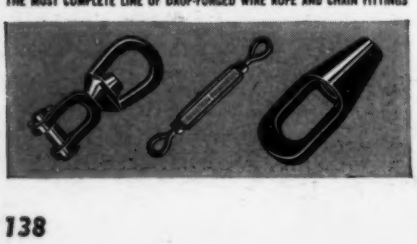

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ship of the subsurface or mineral rights, and that the company could mine the materials from the land.

### State Workmen's Compensation Act

A contract is void, even when approved by a State Industrial Board, for an employer who is not protected by the State Workmen's Compensation Act.

For instance, in *Pullman Monument Company v. Free,* 55 N. E. (2d) 318, the testimony showed facts, as follows: An employee of a monument company contracted silicosis and died. The counsel for the company with approval of the State Industrial Commission entered into a written contract with the dependents of the deceased employee agreeing to pay them $3,750 "in full compromise settlement of all claims."

Later it was discovered that the company was not protected by the Workmen's Compensation Act. Therefore, the Industrial Commission refused to pay the agreed $3,750. The dependents sued and recovered damages from the monument company.

### Ventilating Fan

Almost all states have enacted laws which require employers to install modern ventilating equipment designed to eliminate from the air particles likely to effect injury to employees. Failure of employes to conform with these laws may result in their damage liability for injury to employees.

For example, in *Scroggs v. American Company,* 142 Fed. Rep. (2d) 297, an employee who contracted silicosis sued his employer for damages and proved that he had inhaled particles of free silica which resulted in a condition in the lungs known as silicosis. Also, the employee proved that the employer had failed to install an exhaust fan which would have removed a large percentage of the dust from the air in the plant. The lower court held the employer liable in damages, and the higher court approved the verdict saying:

"Numerous methods are possible and practicable for protecting employees from the inhalation of dust. Notwithstanding knowledge of this condition, he (employee) was permitted to remain at his employment until he became completely and permanently disabled."

Also, see *McBeth-Evans v. Brunson,* 122 N. E. 439. Here the employer knew of the dangerous consequences likely to follow from an employee's unnecessary exposure to dangerous dust. The employer failed to install equipment likely to reduce disability of his employees, and the higher court held him liable in damages for silicosis contracted by an employee.

### Injured While Playing

An employee injured while acting outside the scope of employment is not entitled to recover compensation under the State Workmen's Compensation Laws.

For instance, in *Eagle Company v. Davison,* 132 Pac. (2d) 937, an employee who found a dynamite cap began amusing himself and other employees by striking the cap against objects. While so doing the cap exploded in his hand causing severe injury to his left hand. The injured employee filed a claim for compensation under the State Workmen's Compensation Act.

The higher court refused to award compensation saying:

"An injury sustained as the result of play indulged in by an employee for his own amusement does not arise out of the employment and any disability resulting therefrom is not compensable."

For comparison see *Stark v. Martin Company,* 37 Atl. (2d) 651. In this case a truck driver asked an employee to assist him. The employee was seriously injured and sued his employer for compensation. However, since the employee was not acting within the scope of the employment when he sustained the injury, the higher court held the employer not liable, and said:

"The injury must have had its origin in a risk connected with the employment, and to have flowed from that source as a rational consequence."

### Acts of Agents

An "agency" may arise from the general conduct of an employer, resulting in the latter's liability of contracts made by an employee.

For example, in *Alexander Company v. Medford,* 170 S. W. (2d) 809, it was shown that a company has been engaged for many years in buying sand, gravel and other materials through its agent or employee, who not only purchased various materials but also attended to the company's general business.

Suit was filed against the company by a seller to recover several thousand dollars for materials purchased by this agent. During the trial both the agent and the company officials testified that the agent had in the past been the company's agent but that he was *not* their agent at the time these materials were purchased.

Notwithstanding this testimony the higher court held that the company must pay for the materials purchased by the agent.

The reason this company was held liable for payment of this merchandise purchased by the agent is that the seller had *not* been notified by the company when the agent had terminated his employment.

### Liable for Acts of Contractor

Generally speaking, one who employs an independent contractor is not liable for damaging acts of the contractor. However, in *W. E. Belcher v. Woodstock Mineral Company,* 15 So. (2d) 625, it was disclosed that a contractor contracted with a company to perform certain dangerous work on the company's property. While doing the job the contractor damaged the adjoining property whose owner sued the company for damages.

The higher court held the company liable for $3,000 damages, saying:

"A person causing something to be

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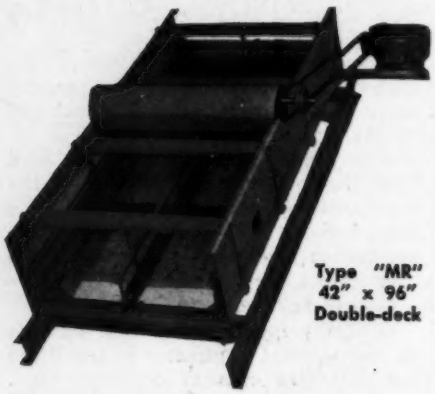

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done, the doing of which casts on him a duty, cannot escape from responsibility attached to him of seeing the duty performed by delegating it to a contractor."

### Can Sell Anything

Recently, a higher court held that a person can sell anything whether or not he owns it. Moreover, the purchaser may recover damages from the seller who breached his contract, and conversely the seller may recover damages from a purchaser who breached the contract.

For example, in *Tuft v. Brotherson,* 150 Pac. (2d) 384, it was shown that a person named Tuft agreed to sell a used gravel loading machine to a company. Tuft did *not* own the machine but he believed that he could purchase it from the owner at a low price and thereby earn a profit. Later the company notified Tuft that it woud not accept and pay for the machine. Tuft sued the company for the full profits he would have earned had the company accepted and paid for the machine.

The company attempted to avoid liability on the grounds and contention that the contract was void because Tuft did not own the machine he had agreed to sell. However, the higher court held the company fully liable to Tuft, and said:

"That one may lawfully agree to sell either personal or real property to which at the time as has no title cannot be questioned, and the want of title furnishes no ground for rescission by the buyer. . . . When the purchaser is in default of the payment of the purchase price he cannot, against the will of the seller, repudiate such contract."

### Employer Not Protected

According to a recent higher court the State Workmen's Compensation Act does *not* apply to employees *not* employed in the *usual* course of trade, business, occupation or profession of the employer. Therefore, employers must carry compensation insurance on *all* employees in *different* business classifications to avoid damage suits by injured employees.

For illustration, in *Livingstone Company v. Hartford,* 29 Atl. (2d) 323, it was shown that an employer had insurance under the State Workmen's Compensation Act which protected office employees, salesmen, drivers, chauffeurs and their helpers.

The employer purchased a building and began renovating and remodeling it. One day an employee was seriously injured while working on the building.

The higher court refused to award the employee compensation and held that if the employer had desired protection against injuries to employees who were working to remodel the building he should have reported the new business and obtained an amended certificate from the state insuring employees who worked on the building.

---

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# TRAFFIC News Digest

### CENTRAL FREIGHT ASSOCIATION DOCKET

**Docket 83922 (2)**—It is proposed to establish on stone, crushed, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Georgia, Ind., to Huey, Ill., Sandoval, Shattuc, Ill., 119; Salem, Ill., 110; Summerfield, Ill., 124 cents net ton, subject to ExParte 162 increase.

**Docket 83930 (2)**—Proposed to establish on limestone, agricultural, unburned, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Georgia, Ind., to Breeze, Ill., 110 cents; Shattuc, Ill., 99 cents net ton, subject to ExParte 162 increase.

**Docket 83935 (2)**—It is proposed to establish on limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds from Conneaut, O., to representative points in New York, Pennsylvania and West Virginia, rates shown in Exhibit C.

**EXHIBIT C**

| | Rates in cents per ton of 2000 pounds. Subject to Exparte 162 increase. Proposed rate.* |
|---|---|
| Ambluco and Mapes, N. Y. | 2.04 |
| Anawalt and Filbert, W. Va. | 3.36 |
| Beaver Dam and Freeman, N. Y., Knoxville, Pa. | 2.26 |
| Black Creek, N. Y. | 1.87 |
| Cameron Mills, N. Y. | 2.15 |
| Hinsdale, N. Y. | 1.82 |
| Wilco, W. Va. | 3.25 |

*ICC Docket 25220 Carriers Revised Scale.

**Docket 83973 (2)**—Limestone, ground or pulverized, unburned, carload minimum weight 60,000 pounds. Establish on, from Conneaut, O., to Cincinnati, O., 259 cents net ton, subject to ExParte 162 increase.

**Docket 83978 (2)**—Crushed stone, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Melvin, O., to Boyds, O., 66 cents net ton, subject to ExParte 162 increase.

**Docket 84099 (2)**—Proposed to establish on crushed stone, in bulk, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply, from Maumee, O., to Bryan, O., 94 cents; Edgerton, O., 99 cents net ton, subject to ExParte 162 increase.

**Docket 84153 (2)**—It is proposed to establish on sand (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) and gravel, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible

capacity, actual weight will apply from Gosport, Ind., to Morgantown, Ind., 97 cents and Unionville, Ind., 92 cents net ton, subject to ExParte 162 increase.

**ILLINOIS FREIGHT ASSOCIATION**

**Docket IRC-511-615**—Limestone, ground or pulverized, unburned, carload from Prairie du Rocher, Ill., to Burlington, Wis. Present—303 cents per net ton; Proposed 264 cents per net ton.

**Docket IRC 511-635**—Agicultural limestone, carload, from Prairie du Rocher, Ill., to Kinmundy and St. Peter, Ill. Present—$1.28 per net ton, including ExParte 162 increase of 15 cents per net ton. Proposed—$1.11 per net ton, including ExParte 162 increase of 15 cents per net ton.

**DOCKET STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION SUBMITTALS**

**Docket 38107 (c)**—Establish following rates on lime, common, hydrated, quick or slack, in bulk or packages, carload Mobile, Ala.:

| | Rates in cents per ton 2000 lb. | |
|---|---|---|
| To | Min. Weight 30,000 lb. | Min. Weight 50,000 lb. |
| New Orleans, La. | 286 | 229 |
| Baton Rouge, La. | 330 | 264 |

**Docket 38208 (c)**—Establish a rate to permit shipments of mixed carloads of lime, common, hydrated, quick or slack, and limestone, ground, or pulverized, in packages, charges to be made at actual weight at the applicable rate for each of the respective commodities subject to the highest carload minimum weight for any article in the mixture, from Kimballton, Va., and Ripplemead, Va., to points in Southern Territory.

**TRUNK LINE ASSOCIATION DOCKET**

**Docket 44390**—Limestone, crude, when loaded in open-top equipment, carloads, minimum weight 90 percent of marked capacity of car, etc., provided that orders will not be accepted for open-top cars of less marked capacity than 80,000 pounds, from Stevens City, Va., to Covington, Va., $1.49 per net ton, subject to ExParte 162 increase in lieu of current sixth class rate of 22 cents per 100 pounds. Reason: Comparable with rates applying from other points in the immediate vicinity.

**Docket 44442**—Chemical lime, in bulk, in covered hopper cars, carloads, minimum weight 100,000 pound, from Kimballton, Va., to Ivanhoe, Va., $1.50 per net ton, subject to ExParte 162 increase. Reason: Comparable with rates applying from and to other points.

**WESTERN TRUNK LINE NEW APPLICATIONS**

**Docket E-41-889**—It is proposed to establish on crushed stone, carload minimum weight 90 percent of the marked capacity of car, except that when car is loaded to full visible capacity, actual weight will govern, a rate of $1.38 per ton of 2,000 pounds from Atchison, Kan., to Bellevue, Neb.

**Docket X-E-41-890**—Stone, crushed, carload, from Vigus, Mo., to Leslie, Mo. Poposed—42 cents per ton of 2,000 pounds, to apply on intrastate traffic only. Publication to be made on short notice, subject to expiration date of December 31, 1947.

**Docket X-E-41-895**—Silica sand and silica sand pit strippings, carload minimum weight 50,000 pounds. From Klondike, Mo., to Toledo, O. Proposed to establish rate of $3.60 per net ton.

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**STATEMENT OF OWNERSHIP**

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, of PIT AND QUARRY, published monthly at Chicago, Illinois, for October 1, 1947.

State of Illinois, County of Cook, *ss.*

Before me, a notary public in and for the state and county aforesaid, personally appeared H. H. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the act of March 3, 1933, and July 2, 1946, (section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit):

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Complete Service Publishing Company, Chicago, Ill.; Editor Walter E. Trauffer, same; Managing Editor, Walter E. Trauffer, same; Business Manager, H. W. Baumgartner, same.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owing or holding one percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address as well as those of each individual member, must be given).

Complete Service Publishing Company, Chicago, Ill.

Harry W. Baumgartner, same.

Ida A. Baumgartner, same.

James E. Montgomery, same.

Evelyn W. Montgomery, same.

Stanley A. Phillips, Evanston, Ill.

Florence S. Phillips, same.

Lanetta B. Smith, Glen Ellyn, Ill.

W. T. Klussman, Brookfield, Ill.

William T. Klussman and Lanetta B. Smith, Trustees of Bernice Joan Smith, Trust No. 1, Chicago, Ill.

William T. Klussman and Lanetta B. Smith, Trustees of Harry William Smith, Trust No. 1, same.

William T. Klussman and Lanetta B. Smith, Trustees of Ray Light Smith, 3rd, Trust No. 1, same.

William T. Klussman and Lanetta B. Smith, Trustees of Stephen Howard Smith, Trust No. 1, same.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of the total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is..... (This information is required from daily publications only.)

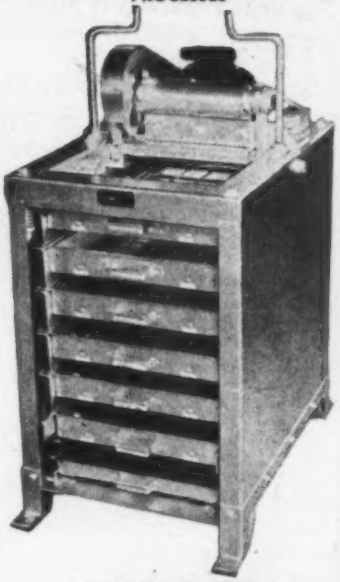
H. W. BAUMGARTNER,
*Business Manager.*

Sworn to and subscribed before me this 23rd day of September, 1947.

(SEAL) RAYMOND S. SCHULTZ,
(My commission expires January 21, 1951.)


**GILSON**
**Mechanical Testing Screen**

ASSURES CONTROL OF YOUR PLANT PROCESSES



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*Makes tests quickly and accurately
*Two to seven separations simultaneously
*One machine for the entire size range
*Screen trays independently removable
*Trays adjusted to same tare weight
*Visible separation to refusal
*Few moving parts to wear out
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Let us send you complete information.

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IT COSTS NO MORE TO USE THE BEST

REPLACE WITH
*"Indian Brand"*

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**Dipper Teeth**
**Shovel Treads**

**Crusher Jaw Plates**
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**Pulverizer Hammers**
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**Ball Mill Liners**
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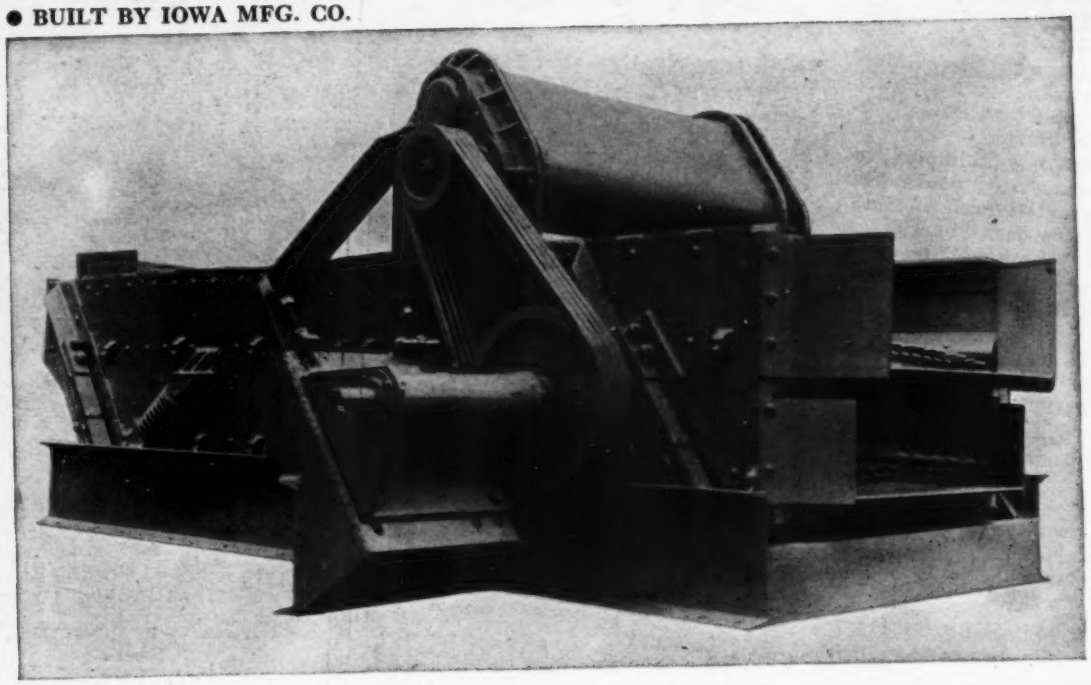

# Bearing Capacity

## For More Screen Capacity!

**Whether this CEDARAPIDS Horizontal Vibrating Screen is installed in a stationary or in a portable gravel plant, SKF Spherical Roller Bearings help it to step up production and cut operating costs. Long-lived SKF high capacity, self-aligning bearings are mounted on the two unbalanced alloy steel shafts driven at a constant ratio by timing gears. Another outstanding example of the way SKF's invention—the spherical roller bearing—is used in the quarry industry.** 6349

SKF INDUSTRIES, INC.
Front St. & Erie Ave., Philadelphia 32, Pa.

# NEWS OF CONCRETE MANUFACTURERS

## Carl A. Menzel Named Head of P.C.A. Bureau—Ruhling Gets New Post

Establishment of a training course in the fundamentals of concrete making and concrete construction practices for technical personnel of the Portland Cement Association and its member

J. A. Ruhling

C. A. Menzel

companies has just been announced by Frank T. Sheets, president of the association.

John A. Ruhling, veteran concrete man who has been manager of the association's Housing and Cement Products Bureau since 1944, has been appointed manager of technical personnel training, effective September 22. Carl A. Menzel, research engineer with the association since 1928, has been appointed to succeed Mr. Ruhling as manager of the Housing and Cement Products Bureau.

Mr. Menzel has had more than 30 years' experience in scientific research and development work relating to concrete, steel, brick and other building materials. He is widely known for his work in determining the fire resistance of building materials.

During his 19 years with the association, Mr. Menzel has developed test procedures and apparatus for many notable studies leading to improvements in reinforcing bars and in the uses of both reinforced concrete and concrete masonry, including studies of bond between concrete and steel.

For seven years prior to joining the association staff, Mr. Menzel was in charge of fire tests on building materials at the Underwriters' Laboratories in Chicago. He is the author of many published scientific papers. His most recent work has been in the development and study of apparatus and field methods for determining the air content of freshly mixed concrete.

## Dutch Concrete-Mortar Firm Organized in Rotterdam

A new Dutch enterprise, N. V. Betonmortelfabriek Rotterdam, has been launched by a group of prominent building concerns of the Netherlands. The concrete and mortar company will be capitalized at 2,000,000 guilders, approximately $750,000. Construction of the firm's facilities, to be used mainly for the reconstruction of Rotterdam, is expected to be completed early next year.

## S. C. Concrete Masonry Men Form New Association

At the organization meeting of the South Carolina Concrete Masonry Association, held recently in Columbia, W. R. Bonsal was elected president. Mr. Bonsal is associated with the Lawrence Stone and Gravel Company of that city.

The purpose of the organization is "to promote the manufacture of quality concrete masonry units and to promote and advertise the sale and use of these products throughout the state." A.S.T.M. specifications will be used as standards.

Named to the board of directors were the following: Bland Campbell of the Campbell Concrete Works, Columbia; Frank Senn of Senn Brothers Concrete Block Co., Newberry; F. M. Cheatham of the Spartanburg Concrete Company, Spartanburg; M. E. Fitzgerald of the Gaffney Concrete & Supply Co., Gaffney; L. H. Collins of the Pee Dee Building Industries, Marion.

## Whitehall Cement Mfg. Co. Announces 3 Appointments

The Whitehall Cement Manufacturing Company has announced three recent appointments in its sales staff, as follows:

Eugene T. Barrett has been named Philadelphia district sales manager; Ernest F. Stickles is New York district sales manager; and Edwin J. Soldwedel is the new metropolitan manager for New York.

## *Coming Events*

*January 12-16, 1948—Cleveland.* Second National Materials Handling conference and exposition, Public Auditorium.

*January 21-23, 1948 — Cincinnati.* 18th annual convention and exhibit, National Ready Mixed Concrete Association, Netherland Plaza Hotel.

*February 23-26, 1948 — Denver.* 44th annual convention and exhibits, American Concrete Institute, Shirley-Savoy Hotel.

*February 26-28, 1948—Roanoke, Va.* Annual convention, Sand-Lime Brick Association, Roanoke Hotel.

*March 1-3, 1948—New York.* Annual convention, National Concrete Masonry Association, Hotel New Yorker.

## Kalamazoo Firm Acquires Franchise for Moderncrete Process Invented by GI

"Moderncrete," a patented material used in the manufacture of wall slabs for the construction of houses, is made under franchise rights by the B and B Moderncrete Company, Inc., of Kalamazoo, Mich.

The inventor, Cecil Scaff of Flint, Mich., perfected his experiments with cement, celocrete and perlite while he was in the Army Air Forces in England. After the war he obtained American patents for his product and established a firm known as Moderncrete, Inc.

Eight-foot slabs of the material are used in the construction of houses. The inventor claims that Moderncrete weighs only one-half as much as concrete slabs of similar size, but is twice as strong. He adds that it will float, can be sawed and nailed and is fireproof. It is made with an oil base mixed with water.

In order to stimulate interest in the material, B and B Moderncrete, Inc., is constructing a five-room house of the slabs in Kalamazoo. Charles E. Berner is president of the company and Peter Boukma is secretary-treasurer.

## R.M.C. Producer's Advertising Aimed at Readers' Civic Pride

An attractively illustrated two-color booklet entitled "A Greater, More Beautiful Duluth Is Being Built" has been issued by the Whitney Ready-Mixed Concrete Company of Duluth, Minn. The first section of the pamphlet carries illustrations of typical Whitney jobs which have enhanced the beauty and value of the city's homes.

These views are followed by pictures of plant and laboratory equipment and an impressive photograph of the company's fleet of truck mixers. Other illustrations show additional examples of the application of the firm's product.

## New Equipment Installed to Meet Growing Block Demand

To meet the demands of increasing business, J. J. Van Vliet & Son, makers of cinder and cement blocks at Marlborough, N. Y., are installing a larger cinder crusher. The new equipment, designed by Mr. VanVliet, is expected to handle 12 carloads of cinders a week.

The plant's present capacity of cinder blocks is 15,000 per week; approximately the same number of concrete units are turned out in a week. In recent months the firm installed a larger block machine, which has substantially increased the output.

## Plans Nearing Completion For 44th A.C.I. Meeting And Exhibit at Denver

Convention week—February 23 to 26, 1948—for the American Concrete Institute will be observed as the 44th annual meeting of that organization in Denver, Colo.

According to E. W. Thorson, the local committee chairman, the program being planned will be the best in the history of the A.C.I. One of the highlights of the convention will be the presentation of a paper on the rehabilitation of the 37-year-old concrete Barker Dam by the "Prepakt" method. Collaborating in the preparation of the paper are the following: Professor R. E. Davis, director of the engineering laboratory of the University of California and a consulting engineer on the project; William T. Neelands, resident engineer at Barker Dam; and E. Clinton Jansen, retired chief hydraulic engineer of the Public Service Company of Colorado, owner of the dam. The project involves the repair of advanced deterioration of the upstream face and to add mass to the gravity structure. Barker Dam is situated 8,200 feet above sea level in the Colorado Rockies.

Persons interested in securing exhibit space are requested to communicate with O. O. Phillips, exhibits chairman, 519 Seventeenth Street, Denver 2, Colo.

## If You Want Concrete Block Stay Away from Miami

The shortage of concrete block in the Miami, Fla., area has been described as more critical than any existing during the recent war years. Manufacturers cited increased demand (caused by the lifting of restrictions on commercial building), lack of cement and crippled transportation facilities as major causes of the shortage.

S. W. O'Neal Jr., president of one Miami block firm, stated that he had been telephoning cement mills in many cities, only to be told that there would be no relief for some time. Terry Maule, who is associated with another local block firm, declared that his company was two months behind schedule.

## Cumberland Portland Cement Signs Hamner on Sales Staff

J. W. Hamner Jr.

John W. Hamner Jr., who has been a member of the traffic department of the Illinois Central Railroad at Jackson, Tenn., has been appointed salesman for the Cumberland Portland Cement Company, according to an announcement made by P. T. Crownover, Cumberland vice-president in charge of sales.

Mr. Hamner will cover the state of Mississippi for Cumberland.

Fred W. Morse and Fred W. Plapp, both of Worthington, O., recently joined the staff of the Universal Concrete Pipe Company at Columbus, O. Mr. Morse will be in the production engineering and control department and Mr. Plapp in the product design engineering division.

• Here's one instance, at least, in which the shoemaker's children seem to be well shod. Traverse Leaman, owner of the Master Block Company, located near Minneapolis, Minn., has just completed this attractive concrete masonry office building for his own use. In addition to providing space for general office and sales purposes, the 38- by 26-ft. structure incorporates a small combustion machine shop and a two-car garage. The large overhang of the eaves keeps the building cool in hot weather without excessive reduction of light. Although it is not apparent on the unpainted walls, the horizontal joints have been accented to conform with the long low lines of the building. Mr. Leaman told us that having this well-constructed masonry building has already paid off handsomely in several ways. In addition to an inherent advertising value, it helps customers to visualize the finished effects they may obtain with concrete block, and shows them exactly how specific problems are met. With Mr. Leaman furnishing the masonry units, the finished building represents an investment of $2,400. We'd guess it to have a promotional value many times greater that that amount.

## New Aggregate Maker With Catholic Tastes Offered to Industry

The Stearns Manufacturing Company at Adrian, Mich., is the exclusive producer of Sinterlite equipment, under patents and applications owned by the Sinter Processing Corporation of New York, N. Y. With such equipment concrete products manufacturers can produce from materials which are available locally a satisfactory aggregate for lightweight concrete masonry units.

The basic unit is the Sinterlite machine, consisting of an automatic continuously-rotating sintering pan into which the raw materials, mixed with a small amount of fuel, are fed for sintering. Necessary equipment for handling, storage and mixing of the raw materials and for handling, crushing and grading the finished clinker has also been engineered by Stearns and is offered as a standard "package."

In numerous Sinterlite tests a wide variety of raw materials, including slag, clay, earths and shale were found satisfactory for producing lightweight aggregates which compared favorably with high-grade types now in use.

## Sand-Lime Brick Association Meeting Feb. 26-28, 1948

J. Morley Zander, secretary and manager of the Sand-Lime Brick Association, has announced the date and place for the annual convention of the organization, February 26 to 28, 1948, at Roanoke, Va.

In commenting on the program, Mr. Zander stated that papers would be presented on the following subjects: curing concrete by high pressure steam; the modular sizes of units; loading and piling of materials; effect of sand and grain size on machine operation, curing and finished product. Convention headquarters will be the Roanoke Hotel.

## American Pipe & Constr. Co. Wins $1,000,000 Contract

A $1,074,973 contract for a 16-mile extension of the San Diego aqueduct has been awarded to the American Pipe and Construction Company of Los Angeles by the San Diego County Water Authority.

The extension will run from the west portal of the San Vicente tunnel through Lakeside, Bostonia and Jamacha, to the Sweetwater Reservoir. It will serve the Lakeside, La Mesa and other irrigation districts.

## Block Plant Worker Killed In New England Hurricane

Torrential rains and roaring winds which swept through extensive areas of New England caused one death at Easton, Mass., early this fall. Henry Manchester, 65, was killed when a one-story cement block plant collapsed after its roof had been ripped off by the wind. Fifteen other workers escaped death when the rear wall of the building caved in.

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# High Efficiency, Huge Capacity Are Features of Illinois Brick's New Plant

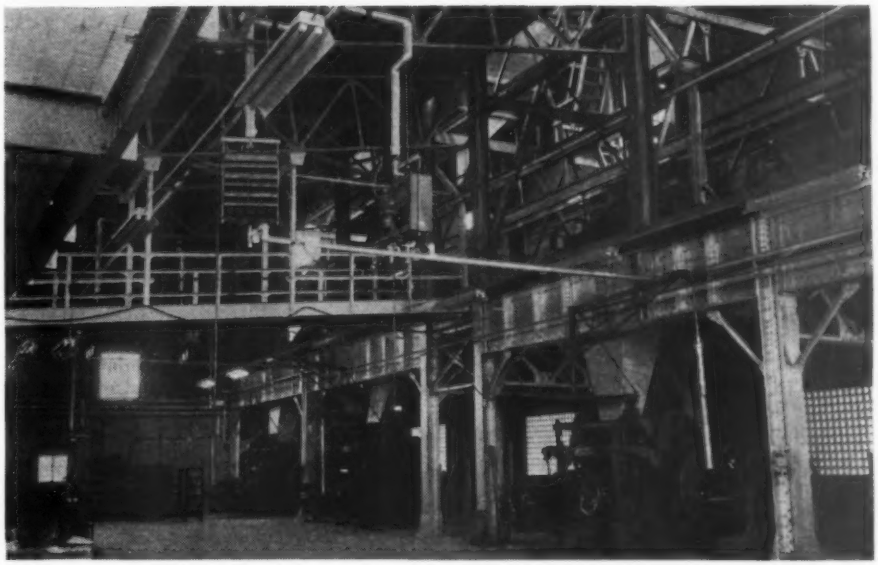
another ON THE SPOT report

ONE of the highlights of the 27th annual convention of the National Concrete Masonry Association, held in Chicago last February, was an inspection tour of Illinois Brick Company's mammoth new block plant at Blue Island, Illinois. On that occasion some 400 members and guests of the association saw in operation one of the world's largest plants for the manufacture of concrete masonry units. An outstanding example of modern engineering design and high productive efficiency, the Blue Island plant has been the subject of much discussion throughout the industry, and the editors of THE CONCRETE MANUFACTURER are for this reason particularly pleased to give their readers this first-hand report based on 7 months of operating experience.

**By WILLIAM M. AVERY**

In writing about a plant such as this one, there is a natural tendency to overemphasize its bigness and its tremendous productive potential, for these are the characteristics which carry the maximum impact. To dwell upon them exclusively, however, would be to tell only a fraction of the story, and perhaps the least important fraction, at that.

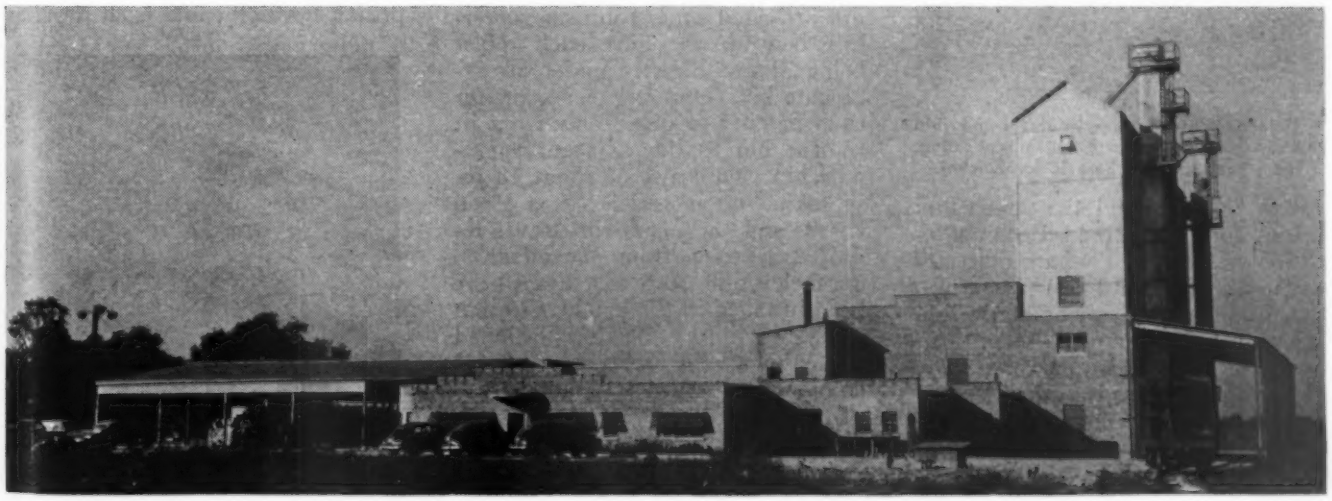
In our judgment the factor which clearly makes the Blue Island development one of the outstanding block plants in the country is its deceptively simple but wonderfully efficient layout. It is, so far as we can judge, a plant in which the designer has anticipated and somehow contrived to eliminate every conceivable bottleneck which might impede the smooth, effortless flow of materials. Even with 4 Besser Super Vibrapacs turning out more than 19,000 units per shift, there is no evidence anywhere in the plant of stress, excitement or bustling activity. The various departments all seem to function with a smooth, effortless rhythm which might cause the uninitiated to conclude that the production of 2,400 8-in. equivalents per hour is a rather trifling matter.



• This general view of the machine room at Illinois Brick Company's new plant shows three of the block machines, the fourth being out of camera range at the right. Mixers and bin gates are visible above. Note the unit heaters and fluorescent lights.

Although this plant was designed with a view to receiving all materials by rail, at present only cement is delivered in cars. Shortage of cars, excessive demurrage charges and other difficulties have made it necessary to rely almost wholly upon trucks for the delivery of aggregates. Waylite aggregate, an expanded slag by-product of steel mill operations, is used exclusively in all concrete masonry units produced by the Illinois Brick Co. Shipments are made to Blue Island from three nearby plants of the Waylite Co. Two sizes of the material are used—fine (minus ¼-in.) and coarse (minus ½-in. plus ¼-in.) in the approximate ratio of 60 percent fine to 40 percent coarse. With all 4 block machines in operation, about 365 cu. yds. of Waylite are used per day.

The railway siding is covered by a lean-to canopy extending 124 ft.



• A general view of Illinois Brick Company's huge No. 2 block plant at Blue Island, Ill. Raw materials come in on the railroad siding at the right and go out in trucks from the covered storage area at the left.

along one side of the main plant building, adjacent to the elevated storage bins. This very sensible provision makes it possible to unload incoming materials regardless of weather conditions, and thus assures uninterrupted year-around operation of the plant. There are two 10- by 10-ft. track hoppers, one at each end of the canopied section of track, into which either cars or dump trucks may discharge aggregates. Cement is unloaded into a 10-in. screw conveyor located about in the middle of the sheltered section of the track, and since a 30-ft. roadway gives access to the track hoppers from either end of the canopy, there is no interference between trucks and cement cars.

There are three bucket elevators in this material handling system—two Butler No. 244 aggregate elevators, each having a capacity of 75 cu. yds. per hour, and one Butler No. 7 cement elevator with a capacity of 250 bbls. per hour. The aggregates are fed from the track hoppers to the elevators by means of short, 18-in. belt conveyors.

The storage system consists of six Butler U-No. 175 steel bins measuring 17 by 17 ft. They are arranged in a straight line, in two groups each comprising three bins, with a gap of about 8 ft. between. In each group the two end bins are partitioned for the storage of fine and

• Both cement and aggregates come into this canopied section over the railway siding. The elevator shown here is for cement.

coarse Waylite, and the center bin is used for cement only. Each aggregate elevator may discharge directly through a chute and a turnhead into the proper compartment of the bin nearest it, or (by means of the turnhead) onto an 18-in. Barber-Greene conveyor which feeds a small hopper and turnhead arrangement over the more distant bin. Cement is distributed to the two cement storage bins

• Alfred Neubieser is superintendent of both the Blue Island plant and of a smaller plant operated by Illinois Brick at Franklin Park, Ill.

by two 9-in. screw conveyors operating in opposite directions from a flop gate hopper fed by the cement elevator. The combined capacity of the two cement bins is 1,800 barrels, and the four aggregate bins have a combined capacity (heaped) of 688 cu. yds.

To facilitate batching operations, each battery of three bins is served by its own Butler 3-beam traveling weigh batcher. These power-driven machines are suspended from rails beneath the bins. The rails are continuous for the full 112-ft. length of the mixing floor, so that the batcher assigned to the group of bins at the north end may, if necessary, draw material from the south bins and *vice versa*. With the generous storage capacity provided, however, the necessity for this would arise only in the event of a serious delay in shipments to the plant. The batchers are automatically positioned under the various bins and over the mixers by means of limit switches, which are actuated by push-button controls.

The four 50-cu.-ft. Besser mixers are arranged on a common centerline beneath the bins, each mixer being almost directly under an aggregate bin. Thus it is necessary for each batcher to move only from its cement bin to the adjacent aggregate bin, a distance of about 18 ft., in taking on materials for a given batch, and the maximum travel required in going from one mixer to another is only 36 ft. Partitions have been installed in the batchers so that aggregates may be proportioned either by weight or by volume, and comparative results actually seem to

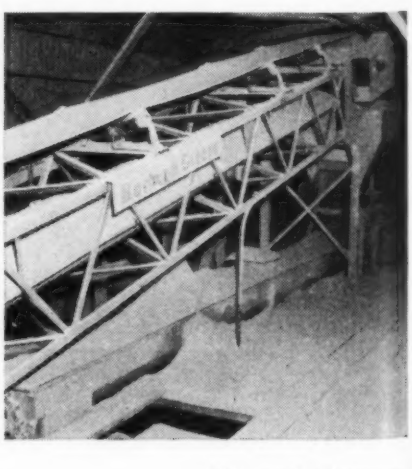
• One of the two 18-in. belt conveyors for distributing aggregates from the bucket elevators to the center bins.

indicate that there are some advantages (with this light-weight aggregate) in using the volumetric method. With these excellent facilities for rapid batching it is possible to allow mixing time of 9 to 10 minutes without undue effort.

The outstanding feature of the machine room on the ground floor level of the plant is the generous amount of space which has been provided to facilitate the movement of lift trucks. The room is 57 ft. wide by 112 ft. 6 in. long, with 12-ft. passageways opening into it from both ends, and two 19-ft. 4-in. curing room passageways opening into the long wall facing the four Besser Super Vibrapac machines. There is a clear height of 20 ft. 2 in. from the floor to the bottom chords of the roof trusses. The compressor room and repair shop and the tool and store room flank the wall at the north end. Access to the mixer floor is gained by means of a stairway and a suspended walkway which spans the open portion of the machine room. Additional walkways extending along the west wall give access to the two steam generating rooms located above the curing rooms.

The molded units are placed in conventional steel racks which accommodate 72 8-in. equivalents. Four Clark Tructractor 3-ton gasoline-powered lift trucks are in operation, one truck normally being assigned to each block machine. Thus each truck hauls green blocks to the curing room, removes racks of cured units to the covered storage area, and returns empty racks to the block machine. Due to the general layout of the plant, particularly with respect to the curing rooms, the lift trucks operate in parallel paths, and there is a complete absence of traffic interference or confusion even when all four block machines are in production.

There are two entirely separate batteries of curing rooms each comprising ten units, and each provided

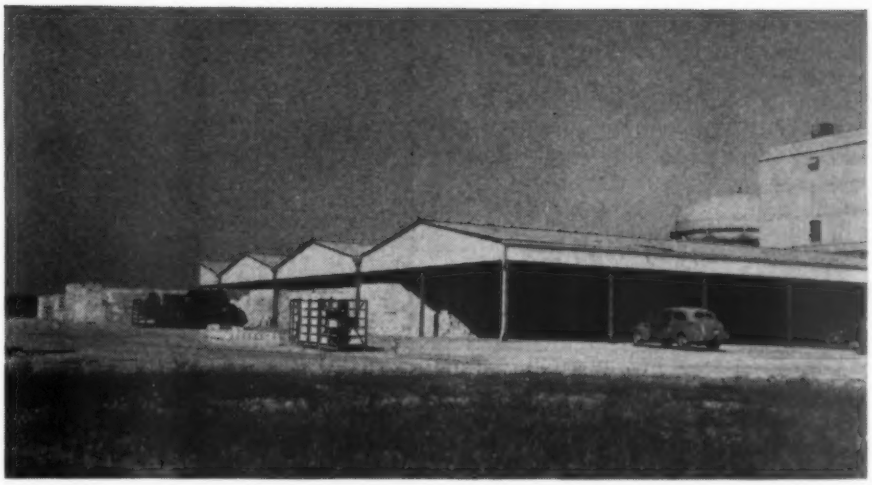


with independent equipment for steaming and drying. In each battery two rows of five kilns face on a common passageway with a clear width of 19 ft. 4 in. The rooms themselves are 12 ft. 8 in. wide and 38 ft. 8 in. long, and they accommodate 18 racks or 1,296 equivalents per room. Thus the two batteries can simultaneously cure an astounding total of 25,920 units.

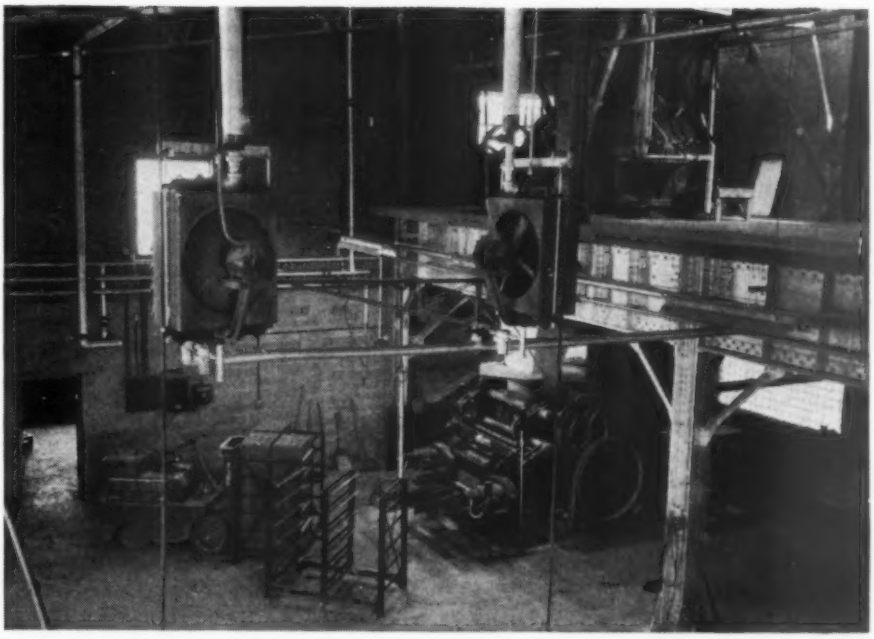
In electing to install a large number of relatively small kilns, the company gave due consideration to the factor of operating economy, particularly with a view to the trend toward higher temperatures in curing. Although no comparative studies are available, there is good reason to believe that smaller losses are incurred with small kilns, and that the overall efficiency and effectiveness of curing are likely to benefit. Losses through the roof are minimized by a 6-in. layer of coarse Waylite fill over the 6-in. reinforced concrete slab. A mop coat of hot pitch provides a vapor barrier between the slab and the fill. Over the Waylite there is a skim coat cement finish which carries a 10-year tar and gravel roof. The rooms are 7 ft. 3 in. high at the receiving ends, slightly lower at the back.

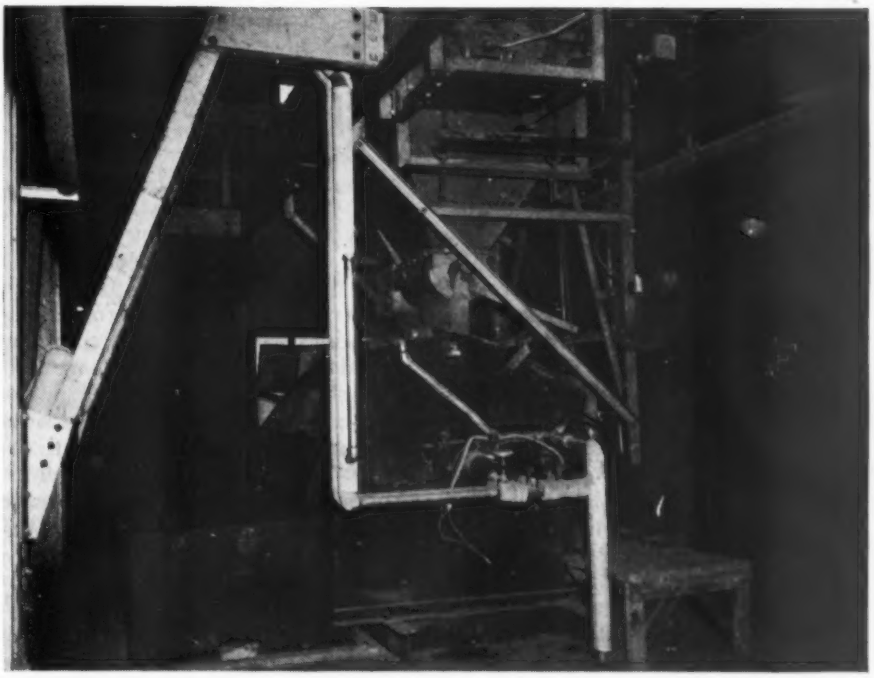
As in the majority of modern installations, these kilns open on the passageway only. The doors hinge at the top and are raised and lowered with ¼-ton Budgit power hoists operating on overhead monorails. Built in the company's own shops, the doors consist of aluminum sheeting on wood frames, with fiber glass insulation to reduce heat loss. When the kilns are in operation, the doors are pressed tightly against rubber packing seals by means of hand screws spaced about 12 in. apart on the side frames. Rubber gaskets on the bottom edges prevent leakage at the floor line. Both floors and roofs are pitched toward the back ends of the kilns to carry off the condensate to floor drains.

Steam for curing and drying is supplied by two 100-hp. Clayton oil-fired steam generators housed in a separate room above the two passageways. Although the two boiler plants normally operate independently, cross-over piping makes it possible for either boiler to supply both kiln batteries in the event of



• The covered storage area measures 72 by 196 ft. and has a capacity of about 280,000 8-in. equivalents.





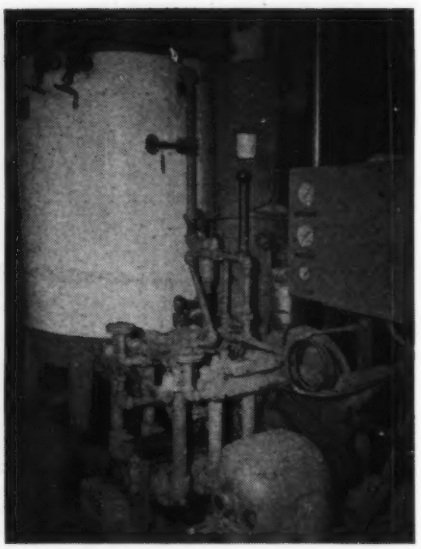
• Center: This bird's-eye view of the setup at No. 4 machine was taken from the catwalk leading to the mixer floor. The deep steel girders carry the bin loads to intermediate columns between the block machines.
• Bottom: A closeup of one of the traveling weigh batchers discharging materials into the No. 4 mixer. The batchers are power driven. Each serves two mixers.

a breakdown. Curing conditions are electronically controlled by means of impulse lines, located in each kiln, automatically increasing the flow of steam when the temperature drops below the required 180 degrees. Apparatus for this system, which constitutes a new development in the concrete masonry field, was manufactured by Control & Instruments Laboratories, Inc.

The curing cycle now in effect at the Blue Island plant is the result of several months' investigation, during which a number of different cycles were tried and their effectiveness compared. During this investigation a test hole was made through the roof of one of the kilns in order that the change in weight of the units through various curing cycles could be studied accurately.

The best results, particularly in respect to absorption, were obtained with the following cycle: after the kilns are loaded, the units are allowed to stay at room temperature for a period of two hours in order to take on their initial set; then live steam is injected at 10 lbs. pressure, and in a three-hour period the temperature is brought up to 180 degrees F.; with the steam still on, this temperature is maintained for a period of one hour; this is followed by a 12-hour soaking period during which the steam is cut off but the kilns are kept closed; the cycle is completed by a 2½-hour drying period, during which the units are exposed to a blast of dry, hot air introduced through openings in the roofs of the kilns.

During the 2½-hour drying period the temperature in the kilns reaches a maximum of only 160 degrees, but this is sufficient to produce dry, white units at the end of the cycle. Outside air is drawn into two large fans (one in each steam generating house), passed through a network of three steam coils, and pumped into the various kilns through a system of ducts on the roof. Each kiln has two inlets with steel doors which may be adjusted so as to distribute the flow equally among the 10 kilns in each group. The inlets are at the front, and when the fans are operating small roof hatches are opened at the rear of the kilns to permit circulation. No effort is made to recirculate the exhausted air. According to our understanding, this curing cycle is now consistently turning out blocks which show an average absorption of about 34 percent. Since this is well within the specification limit, and since it has been achieved at a reasonable cost, it would seem that the 40 percent limitation is not a wholly unreasonable goal for the industry to aim at.



• One of the two 100-hp. oil-fired steam generators which furnish steam for curing and drying the units and for heating the plant and adjacent offices. These units are completely automatic.

A covered storage area, measuring 72 ft. wide and 196 ft. long, has been provided adjacent to the curing rooms. This area, which is open on three sides, has a capacity of about 280,000 8-in. equivalents. The lift trucks have access to it through the passageways between the kiln rooms, and delivery trucks can be driven through the open sides and spotted wherever necessary. Here the unloading of cured units from the racks, and the loading out of delivery trucks, can go on regardless of the elements.

Blocks are stacked 14 units high in the covered storage area. The first seven courses are stacked from racks resting on the concrete slab, forming a platform on which subsequent racks are placed by the lift trucks for stacking seven more courses. When units are loaded directly from the kilns onto delivery trucks, the Tructractor units place the curing racks on raised platforms level with the truck beds (see cut). This practice has been found to speed up loading considerably. A 20-ft. aisle, extending the full length of the runway, is available for cubing operatings when and if the company should decide to adopt that method of handling.

Open storage areas on three sides of the plant provide additional capacity for more than a million units. Although a few small open storage piles have been built up since the plant started operating, the tremendous demand for masonry units in the Chicago area has tended to keep shipments very nearly on a par with production. All the company's trucking, both incoming and outgoing, is handled by hired trucks. Shipments so far have been held within a radius of about 25 miles, a considerable proportion going into the area west of Chicago which is also served by Illinois Brick's No. 1 block plant, located at Franklin Park, Ill.

Construction work on the Blue Island plant, which is designated as No. 2 block plant by the company, was started in May of 1946, and operations commenced in January of this year. The main building is a steel frame structure with corrugated Transite siding and roofing. The superintendent's office, shipping office and display room, all of which adjoin the front of the main building, are of clay brick backed up with 8-in. Waylite units. Other rooms adjacent to the machine room provide generous space for wash, locker and lunch facilities. In cold weather comfortable temperatures are maintained throughout the plant by a system of Grid unit heaters which are supplied by steam generators.

Both the Blue Island unit and the No. 1 plant are managed by Henry Buchholz, long one of the leading spirits of the National Concrete Masonry Association and president of that organization since last February. All the design and layout work on the Blue Island plant were personally handled by Hugo Filippi, vice-president of the Illinois Brick Co. Alfred Neubieser is superintendent of both block plants. The labor force at Blue Island varies from 24 to 32 men, depending upon whether 3 or 4 machines are in operation.

With the new facilities at Blue Island, Illinois Brick is now the country's largest producer of both common brick and concrete block. This 50-year-old concern's entrance into the block business several years ago occasioned a good deal of comment and speculation in the industry. Some observers chose to interpret it as an indication that the brick industry was ready to cry "uncle" in the face of the invasion of its domain by the concrete masonry industry.

We discussed this subject recently with the company's president, John Goodrich. "We're in the business of manufacturing masonry materials for fireproof construction," Mr. Goodrich said. "We made a thorough investigation of the block business, and concluded that while concrete units would to a certain extent take the place of common brick, they also could be used extensively in markets which were not served at all by the brick industry—in floors,

1. Electronic controls regulate the flow of steam to the kilns.
2. One 3-ton lift truck serves each of the four block machines.
3. Ten kilns open on each of the two wide passageways for the lift trucks. Kiln doors are raised and lowered by 1-ton power hoists which travel on overhead monorails.
4. When units are loaded out directly from the kilns the lift trucks are used to place the racks on platforms level with the truck beds.
5. A complete record of the curing and drying cycle on each kiln is kept on large blackboards adjacent to the passageway.
6. Many half units and specials are made with this masonry saw. Culls are also salvaged by cutting them down to half-size units.

ceilings and partitions, for example. In selling a package of goods, including common brick, face brick, paving brick, glazed and unglazed tile, and now Waylite concrete block, we are simply offering to owners and builders a logical, convenient and highly efficient service. They like it, and we think it's sound business."

In backing up its judgment to the tune of $500,000, this company has given a resounding vote of confidence in the future of the block business. In creating with that expenditure of capital one of the finest block plants in the country, it has set a standard of excellence from which the entire industry must ultimately profit.

# National Bureau of Standards Tests Prove Durability of Masonry Paints

THE extensive use of masonry building materials, on which decorative or water repellent treatment is desirable, has increased the need for more complete information regarding the durability of coatings for masonry surfaces. In general the average householder and even the professional painter is not as familiar with masonry paints as with outside house paints. Through advertising and usage, the latter have come to be known not only as to composition but also as to expected performance — particularly their behavior when exposed to weathering. To provide comprehensive data on the large number of paints in the masonry group, exposure tests extending over a six-year period were made on a number of commercial masonry paints by paint chemists of the National Bureau of Standards. Results of this investigation have provided interested individuals and the building industry as a whole with much-needed information.

In the course of the bureau's investigations, wall specimens of stone- and cinder-concrete block, light-weight-aggregate block, new and used common brick, and cast-concrete slabs, were coated with cement-water, resin-emulsion, oil-base, and rubber-solution paints. The organic coatings, that is resin-emulsion, oil-base, and rubber-solution paints, were also applied to wood-frame walls faced with cement-asbestos shingles.

To provide typical masonry surfaces for the tests, several hundred unit walls 2 ft. by 2 ft. by 8 in. were laid, following the usual technique employed in contract construction, and concrete slabs were made in lacquered-wood forms using a 1:1:6 concrete mix. Cement-water paints were scrubbed into these wall surfaces with stiff-bristle scrub or fender brushes, while the organic coatings were applied with regular four-inch paint brushes.

Figure 1. The cinder-block test house (also a field office) constructed by the National Bureau of Standards for use in extensive paint exposure tests to provide comprehensive information as to the durability of coatings for masonry surfaces. Finished with two coats of grout and two coats of rubber base paint, the structure showed no evidence of leakage from wind-driven rain and melting snow during the six years it was in service. Note the cinder-block retaining wall upon which exposure tests were also made. A few of the several hundred wall specimens built for paint exposure tests are shown in the foreground.

Figure 2. A close-up view of the masonry wall of the test house (Figure 1) illustrating good durability of the coating after four years' weathering.

Prior to painting, some of the walls were given base coats of grout, consisting of equal parts of white portland cement and mortar sand (passing No. 20 mesh sieve) mixed with sufficient water to give a creamy consistency. This base produced a hard continuous coating which improved the painting surface by filling the voids in the block and closing the openings in the mortar joints.

After the paints were applied to the representative masonry surfaces, the walls were exposed to atmospheric conditions in Washington, D. C., for periods of three and six years. At the end of these periods, ratings based upon the weathering characteristics and performance of each type of paint were recorded. The results indicate that well-formulated masonry paints, skillfully applied, are durable and that it is possible to maintain painted masonry at minimum cost. The cement-water paints were found to provide a durable as well as decorative coating for exterior walls. Good results were also obtained with oil-base, resin-emulsion, and synthetic-rubber-base paints.

The masonry wall specimens which were exposed for the six-year period in general showed the same results as those exposed for the three-year period. The specimens, as painting surfaces, were rated in the following order: (1) new cement-asbestos shingle-faced wall specimens, (2) stone-concrete block, (3) cinder-concrete block, (4) new common brick, (5) light-weight-aggregate-concrete block, (6) cast concrete, and (7) used common brick wall specimens.

For cement-water paints, the method of application, the curing, and the conditions under which surfaces are painted are more important than the composition of the paints as long as the portland-cement content of the paint is not less than 65 percent by weight. With the pos-

sible exception of cast concrete poured against oiled forms, cement-water paints are satisfactory for the initial painting of new masonry. Further coatings are not necessary, although for improved decorative value, the cement coating can be covered with an exterior masonry oil-base, resin-emulsion, or rubber-solution paint. A synthetic-rubber paint can be applied immediately after the cement-water paint dries, but it is recommended that the cement-water paint be permitted to age for at least two weeks before application of resin-emulsion paints and three months before application of oil-base paints. Sharp sand in the cement-water paint or a priming coat of grout improves the durability of subsequent organic coatings on open-textured walls or those having cracks or other defects. Pure white portland cement or admixtures of cement and lime will also give good results.

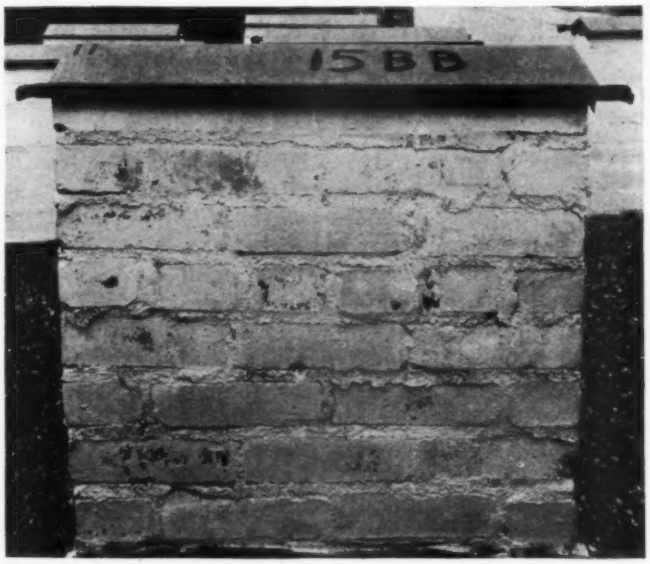
On close-textured masonry or open-textured surfaces that have been moisture-proofed, oil-base paints can be used, although new surfaces of both types should not be painted for 6 to 12 months. Walls must be dry when the paint is applied and so constructed as to remain dry after painting. Applied to a wet wall or one that becomes wet through structural defects, these coatings will fail by scaling and flaking. Oil-base paints usually weather by chalking, a property that makes them self-cleaning and lessens their tendency to discolor or stain.

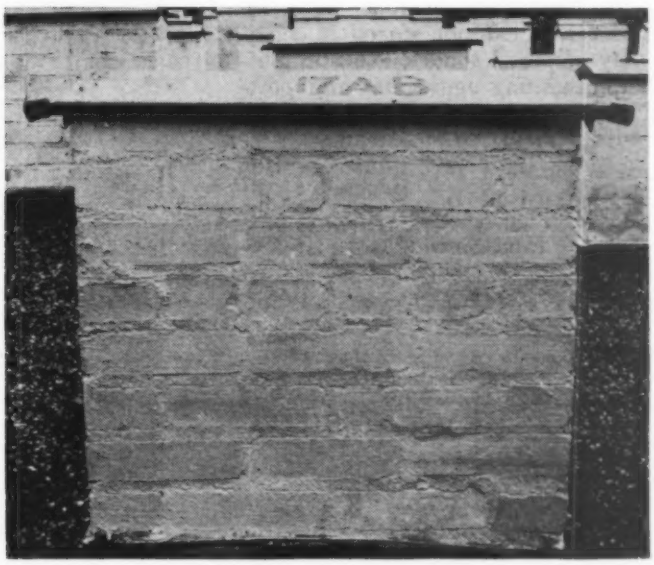
A grout of portland cement and sharp sand gives a good base coat on open-textured surfaces such as stone- and cinder-concrete block, lightweight aggregate-concrete block, and new and used common brick with untooled joints. The grout should be allowed to set at least 90 days. It may be applied immediately upon erection of the wall or at any time during the aging period of 6 to 12 months.

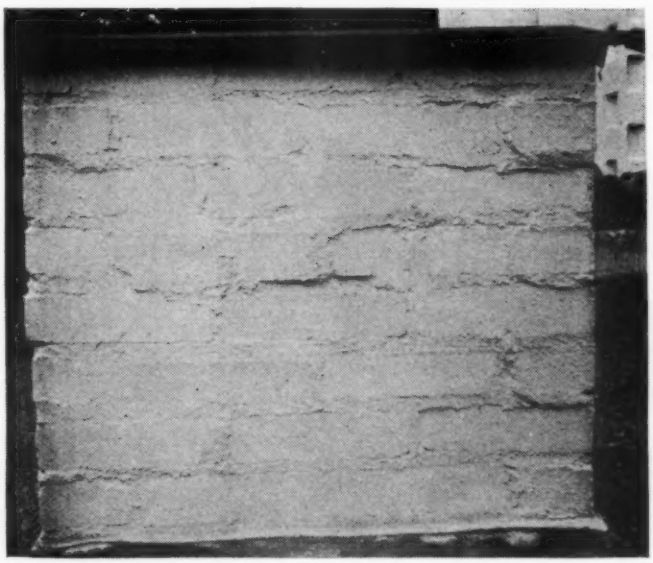
A protective primer, such as rubber-solution paint, should be used as a first coat over the grout if there is a possibility that the wall is damp or contains soluble salts. One coat of the oil-base paint should give a good finish, although two coats will have greater durability.

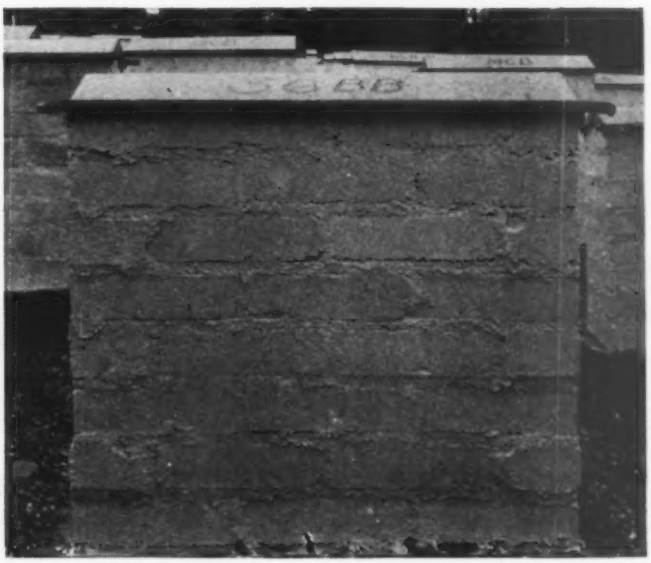
Resin-emulsion paints have good decorative qualities and are durable on exterior masonry walls. Open-textured surfaces and brick walls with cracks around the mortar joints should be given a base coat of grout or cement-water paint containing

**Figures 3, 4, 5 and 6. In the course of masonry paint exposure tests typical wall specimens, coated with various commercial masonry paints, were subjected to Washington, D. C., climatic conditions over three- to six-year periods. Figure 3 is a close-up view of a new common brick test wall painted directly with an oil-base masonry paint (note failure); Figure 4 shows the same paint applied to a similar specimen over a cement-water paint; Figure 5, over grout; and Figure 6, over a rubber-base paint.**





# New California Firm Specializes in Variety of Stucco and Lime Products

another ON THE SPOT report

WELL-GRADED sands and a variety of other processed nonmetallic minerals are being utilized in the new plant of the Highland Stucco & Lime Products, Inc., Van Nuys, Calif., in the preparation of a number of building products marketed in bags under the "Highland" trade name.

**By HARRY F. UTLEY**

Materials used include sand ranging from 14- to 60-mesh, produced in large part at a pit operated by the company about 40 miles west of the plant, Keene's cement, hydrated lime, white cement, gypsum, pumice, mineral colors and chemicals.

End products include both interior and exterior stucco in a variety of pastel shades, acoustic plaster, insulating aggregates and portland cement paints.

Equipment for storing, handling, proportioning and blending the various ingredients was designed, built and installed by the Williams Mechanical Development Co. of Glendale, Calif. Included are a series of elevators and conveyors, bins and hoppers, an automatic weighing batcher and a pug-mill type mixer.

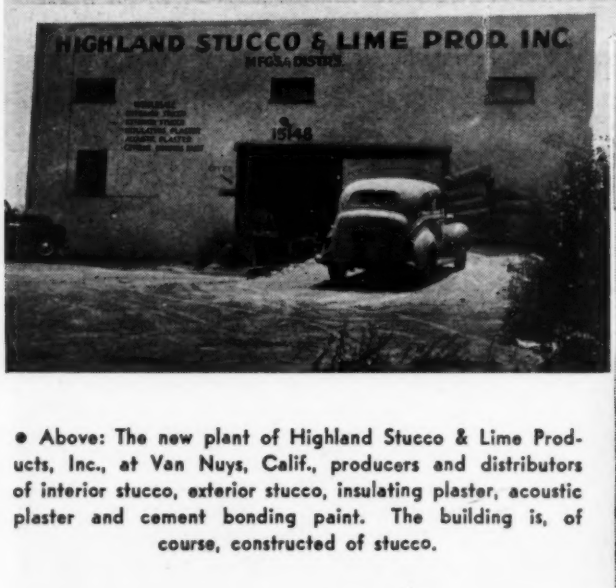
The ingredients, with the exception of the sand and pumice, are purchased in standard bags from producers. The sand and pumice

• Scene in the Highland Stucco & Lime Products plant, showing Keene's cement being emptied into the hopper feeding the elevator to the mixer.

are trucked in and dumped into a concrete bin below ground level which feeds a 35-ft. chain-bucket elevator. A turnhead controlled from the ground diverts the pumice or sand into one of three storage bins which have a combined capacity of about 350 tons. Side gates in the three bins feed a horizontal belt conveyor which, in turn, transfers the load to another elevator and conveyor to deliver the sand or pumice to the top of the blending plant. These materials come off the final conveyor and feed directly into a 1,500-lb. weigh batcher which is set to cut off the feed when the desired weight is reached. The system of feed conveyors and elevators starts again to fill the batcher at the touch of a starter push-button.

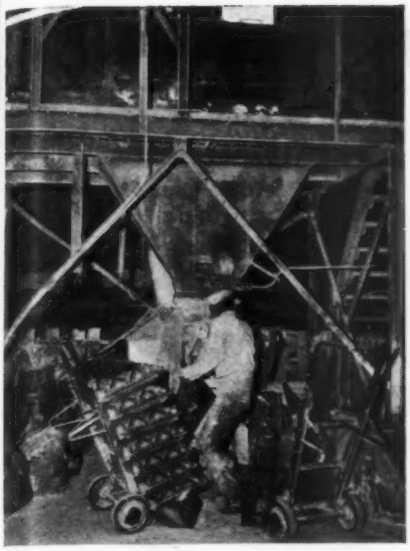
Sand is used only in the production of stucco, the plant's chief product at present; pumice goes into insulating aggregates and acoustic plasters. From the weigh hopper these materials are discharged directly into the 1-ton mixer below, where the sacked ingredients are added, the latter coming via hopper and short bucket elevator. Coloring material is also added at the mixer in carefully measured proportions to insure uniformity of color of the various batches. The colors are fadeproof mineral oxides which are ground at the plant in a Raymond 8-in. screen mill.

The mixer is completely enclosed and serves as a dry blender for the




• Above: The new plant of Highland Stucco & Lime Products, Inc., at Van Nuys, Calif., producers and distributors of interior stucco, exterior stucco, insulating plaster, acoustic plaster and cement bonding paint. The building is, of course, constructed of stucco.

• Below: A view of the storage bins for sand and pumice. At the right may be seen the three spouts from the elevator turnhead, by means of which the material may be diverted into any one of the three bins. The three compartments have a total capacity of approximately 350 tons.



• A carefully weighed amount of coloring material is added at the mixer. Above is the automatic weigh batcher.

• Left: Here an operator is shown at the 1-tube packer which fills the valve-type paper bags. Bag capacity ranges from 25 to 100 lbs., depending on the type of product. Note bags stacked on the lift-truck. The enclosed mixer is immediately above the packer.

various ingredients. After the prescribed period of mixing, the finished product is discharged to the hopper of a St. Regis 1-tube packer for packing into valve-type paper bags. Stucco and acoustic plaster is packed in 100-lb. bags; insulating aggregates (used to produce insulating plaster on the job) in 80-lb. bags; and cement paint in 25-lb. bags.

Plant capacity is about 1,800 sacks of the various products daily. All sales are at wholesale to building-supply dealers within a 50-mile radius. Next year the management expects to add a lime-putty department with an aging capacity of about 300 bbl.

Gus R. Jakel is president; Frank Erwood Jr., is vice-president; and Howard G. Craven is secretary-treasurer of the company. All have had many years' experience in the plastering trades and stucco manufacturing industry in southern California.

The plant is housed in a new 54- by 130-ft. stucco building.

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A. E. Morris has assumed his duties as plant superintendent at the Decatur, Ala., plant of the Universal Concrete Pipe Company of Columbus, O. He has been associated with the firm for several years.

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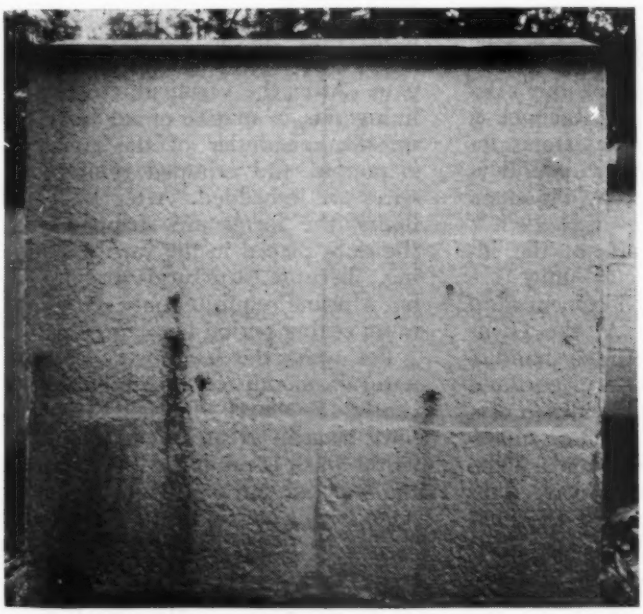


Figures 7 and 8. Comparative results obtained with a cinder-block wall specimen containing iron particles protected by two coats of a cement-water paint (left) and a similar specimen painted with two coats of rubber-base paint over one coat of grout (right). More adequate protection in the latter case is readily evidenced by the absence of the iron-rust stains, which mar the specimen painted directly with the cement-water paint.

## National Bureau of Standards

(*From p.* 163)

sharp sand. Resin-emulsion paints, which provide good coverage, are easily applied by brush or spray to either damp or dry walls. A minimum of three weeks should elapse before painting new masonry walls.

Synthetic-rubber paints come in two types: rubber-emulsion and rubber-solution. They may be applied on either dry or slightly damp wall surfaces but not on wet surfaces, as excessive moisture may prevent adequate bond. The rubber-emulsion paint samples tested by standards bureau scientists were received directly from the manufacturer and represented experimental mixes. They are not available commercially.

Rubber-solution paint is similar in composition to oil paint, with rubber resin replacing the synthetic or natural resin in the vehicle. Such a paint may be brushed or sprayed on a surface to form a protective primer, under oil-base or resin-emulsion paint, or as a complete covering of two or more coats. Normally, two coats give adequate coverage and good durability. On open-textured surfaces, cement-sand grout should first be applied and allowed to dry from 3 to 6 days. Though rubber-solution paint is especially suitable for coating cement-asbestos shingles or siding, it also gives good service on other masonry surfaces.

# Local Safety Ruling Creates Market For Precast Incinerators

By HARRY F. UTLEY

another ON THE SPOT report

EXCEPT for a brief period in the winter when the rains come, southern California is an arid region, and the fire hazard is great. Burning of rubbish is prohibited except in approved types of incinerators equipped with wire-mesh spark arrestors. Nearly a million such incinerators are in use in backyards in Los Angeles County alone, and the production of these units continues to be an important industry.

The leading producer in the Los Angeles area, Currier's Enterprises, pioneered the precast concrete incinerator almost 30 years ago. While its appearance has changed somewhat through the years, done mainly to please the aesthetic sensibilities of the user, its basic function remains that of providing the householder with a long-lasting appliance to dispose of combustible rubbish safely and efficiently.

As the outdoor patio and outdoor cookery—barbecue style—became increasingly popular, the Currier concern added a compact concrete barbecue stove to its line. The three Currier plants in the Los Angeles metropolitan area sold and installed 18,000 incinerators, barbecues and combinations of the two last year. There are a dozen or more plants operating under Currier franchises in other sections of the country all the way to New York and Florida.

The concern maintains headquarters at its Glendale, Calif., manufacturing plant at 4303 San Fernando Road. M. W. Polhemus is general manager. Nearly 100 dealers in the area take orders from models on display but the units themselves are delivered knocked down by the Currier trucks and installed on the purchaser's property by Currier installation crews. The bulk of the sales come through the Sears, Roebuck & Co. chain of department stores located in Los Angeles, Glendale, Beverly Hills, Long Beach, Pasadena and other suburban towns.

• Two trucks of Currier's Enterprises being loaded with incinerator and barbecue slabs for delivery to the installation site.

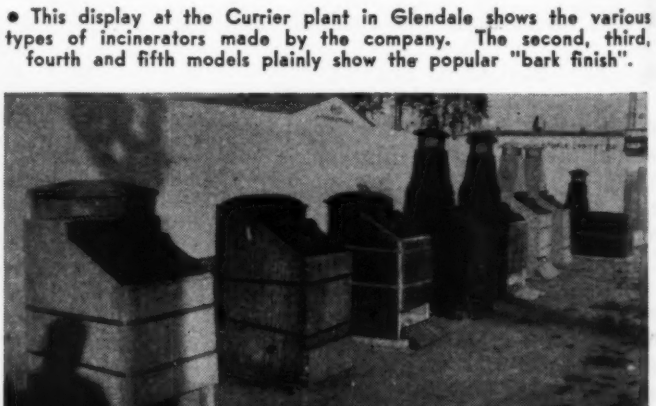
The component parts of the incinerator and barbecue units are precast concrete, a 1:3 cement-sand mix being employed. At the Glendale plant a revolving mixer handles 2-sack batches. Ordinary portland cement is used with the addition of a 3 percent solution of calcium chloride to accelerate hardening. The inner surfaces of the firebox slabs are "mica lined" to resist the heat without damage to the slabs. The lining is placed by first depositing a layer of special concrete in the form, using vermiculite as the aggregate. After the vermiculite-concrete lining sets, a matter of an hour or so, the remainder of the concrete is poured and crimped reinforcing wires are imbedded. After 12 to 18 hours, the forms are stripped and the slabs placed in the yard for curing. Because structural strength is not a prime requisite, only the minimum curing period is required.

For years the units were cast in natural, smooth concrete only but recently the "bark - finished" models have been in greater demand. This rustic finish is produced by combing the exposed surfaces while the concrete is still plastic in the forms and

(*Continued on page* 168)

• Concrete employing vermiculite as the aggregate is first deposited in the forms as a thin layer to resist heat. The forms in the far background have been filled and combed to product a rustic finish.

• This display at the Currier plant in Glendale shows the various types of incinerators made by the company. The second, third, fourth and fifth models plainly show the popular "bark finish".



# New Gray Instrument Measures Moisture and Air Content

The ready-mixed concrete industry, perhaps to a greater extent than most others, has contributed materially to the development of the new techniques and improved equipment used by it. Many examples have been presented in these pages, and here is another one. This instrument performs the dual function of measuring the amount of moisture in mineral aggregates and the amount of air in concrete. It was developed by C. "Dolly" Gray, president of the Ready Mixed Concrete Corporation, Indianapolis, Ind., and vice-president of the National Ready Mixed Concrete Assn. It was introduced to the industry at the recent meeting of the directors of that association at French Lick Springs, Ind. An outline of the history of this instrument and a description of its design and use follows in Mr. Gray's own words.

"Since the strength of portland cement concrete is dependent more on the ratio of the amount of water used compared to the amount of cement used, it is very important that those engaged in the production of concrete know the amount of water that is contained on the surface of their mineral aggregates. By this I mean water that is clinging to the surface of the particles and not the water which is absorbed by the pores in the aggregate itself. Prior to the development of this instrument there was no practical method of making such a determination without the use of heat for drying the surface of the aggregate, in which case we found it impossible to know definitely whether we had evaporated only the moisture clinging to the surface or had in addition evaporated at least a portion of the absorbed moisture. We found also that this method involved considerable time and that considerable concrete would have been delivered before we could make the determination. I therefore set to work to figure out a method which would give accurate results and would accomplish this in the least amount of time.

"The operation of this instrument is based on the fact that mineral aggregate containing surface moisture has a greater volume than the same weight of surface dry aggregate, and that a definite weight of aggregate containing moisture will displace more of the given amount of water than will the same amount of surface dry aggregate. It then became a question of accurately measuring this displacement. To do this we designed a container with a removable sloping top which reduced the sectional area of the pot down to a smaller area, the top being removable and equipped with a gasket so that when the lid or cover was placed on the pot the whole container would be water- and air-tight. We then placed a tube with a water glass connected to it on the top of the cover of the pot so that the water rising in the tube due to displacement could be observed in the glass tube parallel and adjacent to it. The top was then calibrated so that one principal division on the tube represented 1 percent of moisture in the predetermined standard weight of the sample. We at first poured a portion of the

C. "Dolly" Gray and the moisture-air meter.

water in the pot before placing the cover on with a portion of the fixed amount of aggregate and removed the entrapped air from the finer material (such as sand) by stirring. This involved considerable time and created a turbulent foam in the water which made it difficult to read the water column. After we had used the instrument in this manner for about two or three years there was developed a similar instrument for the measurement of air in concrete. This method of measuring air in concrete was based on Boyle's Law. It was easy to see that the instrument we had developed for the measurement of moisture could easily be used, with the addition of a calibration tube and some other minor changes, for the measurement of air in concrete as well as moisture. The thought then occurred to me that we could also measure the entrapped air in the sample of aggregate in the same manner and thus eliminate the necessity of stirring the air out before tightening the cover. The result is that we now have developed the instrument until we simply place the definite sample of sand and gravel in the container, place on the lid, tighten it until it is air- and water-tight and then introduce through the tube the predetermined amount of water which will bring the water level up to the zero of the moisture gauge, providing the sample should be surface dry. Should the material contain moisture, or rather moisture and air, it will, of course, bring it up to a higher level. We then apply the amount of air pressure for which the gauge is calibrated, read the percentage of air on the air calibration, and deduct it from the original reading of the moisture meter, thus arriving at the percentage of moisture in the sample of aggregate to the nearest 1/10 of one percent.

"We do not ordinarily make a separate determination of moisture for each grade of material. The sample which we place in the container is made up of the various grades of aggregate, including sand, in the same proportion that we are using them in our concrete. No computation is necessary other than applying the percentage of moisture thus determined to the total amount of aggregates which we are using in a yard of concrete. This amount is then deducted from the computed amount of water that is required with a given amount of cement to produce strength, as well as the slump, desired.

"We find then that it does not require a technical man to make the test and that almost anyone with a grade school education can prepare his sample and determine the percentage of moisture in the sample in from 10 to 15 minutes, and that the results are accurate and dependable. As brought out above we also use the same instrument for determining the amount of entrained air in our air-entraining concrete.

"We developed this instrument principally for our own use and are now having a local instrument company manufacture one of them for use at each of our plants in addition to the one we now have in our laboratory. It is not our intention to make any special effort to manufacture and sell them to others. However, we are in a position to and will in a short time furnish them to anyone who desires them. We are not yet in a position to determine definitely what the cost will be, but we are of the opinion that it will compare favorably with the cost of the present air meters of recent development which are on the market. The instrument is made of cast aluminum and is much lighter than the air meters now on the market with which I am familiar."

## Natl. Materials Handling Show Opens Jan. 12 in Cleveland

The National Materials Handling Exposition will be conducted for the second year in the Public Auditorium, Cleveland, O., from January 12 to 16, it has been announced by Edwin J. Heimer, president of Barrett-Cravens Co., Chicago, who is chairman of the exposition committee.

By October, 154 exhibitors, 60 percent more than the number represented at the first show, already had contracted for booth space. The exposition, which attracted more than 12,000 top management executives last January, will occupy almost 200,000 square feet of exhibit space.

Educational features will include a conference on materials handling, which will be held concurrently with the exposition; a materials handling theatre, which will present films on handling subjects, and an institutional presentation of materials handling equipment and systems in addition to those shown in the commercial exhibits.

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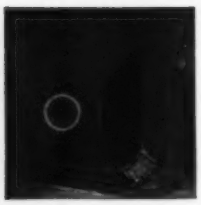

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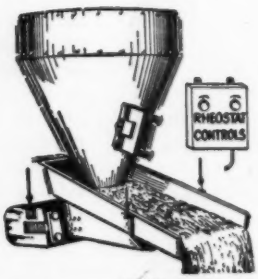


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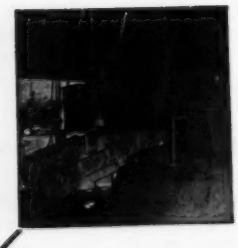

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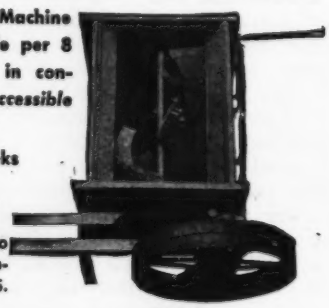

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## Local Safety Ruling

(*From page* 166)

applying a variegated finish which simulates weathered tree bark. Mineral oxides in black, red and green tones are applied by spray to achieve this finish.

The steel forms used to cast the various parts are cleaned and oiled each time they are used. All form joints are precision-machined to insure a snug fit when the slabs are assembled on the job.

Selling prices in the Los Angeles area run from $19.95 for the plain 6½-cu.-ft. incinerator, installed, to $49.75 for a bark-finished combination incinerator and barbecue. All units are supplied complete with cast-iron doors and grates. Barbecue stoves have aluminum griddles and grates, with revolving spits for roasting obtainable at extra cost.

## Indiana Firm Makes Units At Rate of 1500 per Hour

Brownstown, Ind., is the home of a new industry, the concrete block plant of Boss Brothers. Recently-installed machinery which turns out as many as 1,500 blocks per hour performs nearly all the necessary operations automatically.

The units are of various sizes, up to 8 in. by 12 in.; all are 2¼ inches thick. Crush tests indicate a strength up to 3,100 lb. p.s.i. Virtually impervious to water, the units present a glazed appearance; they are made in various colors.

## Pasquini Will Raise the Roof — To Increase Block Production

Plans for alterations at the plant of the Wyoming Valley Cement Products Company at Wilkes Barre, Pa., were recently announced by Dominick Pasquini, proprietor.

Mr. Pasquini stated that he proposed to raise the roof of his plant to accommodate equipment for turning out various concrete products. An investment of approximately $17,000 will be required.

At Quincy, Ill., the Wells Dunbrik Company, owned and operated by Douglas and H. W. Wells, is manufacturing concrete brick under an exclusive Dunbrik franchise for Adams County. The firm, which only recently opened for business in its new building, makes brick in several colors. Water resistance and superior strength are claimed for the product.

James R. MacLean, 69, secretary-treasurer of the Granite Concrete Block Company of Toronto, Canada, until his retirement in 1942, died recently in Mount Dennis, a suburb of Toronto.